PRELIMINARY INVESTIGATION OF TRACE CONTAMINANTS IN PULP AND PAPER MILL EFFLUENTS

July, 1986

Ontario
Ministry of the Environment

The Honourable
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Deputy Minister

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TABLE 1: Description of Mills (1982)*

MILL	LOCATION	RECEIVING WATER/ BASIN/WATERSHED	PROCESSES	SALEABLE PRODUCTS	TOTAL PRODUCTION (Megagrams/day)	BOD (Megagrams/day)	TSS (Megagrams/day)	EFFLUENT FLOWS (1000 cubic meters/day)
Abitibi Price Fine Papers, Port Arthur Division** (APFP)	Thunder Bay	Thunder Bay/ Lake Superior	Pulping: mechanical (stone groundwood) Papermaking Coatings (clay, starch)	Fine and coated papers	275	3.2	1.5	47.9
Abitibi Price Inc., Fort William Division (APFW)	Thunder Bay	Thunder Bay/ Lake Superior	Pulping: mechanical (semichemical & stone groundwood) Papermaking	Newsprint	320	10.2	1.2	22.6
Abitibi Price Inc., Thunder Bay Division (APTB)	Thunder Bay	Thunder Bay/ Lake Superior	Pulping: sulphite, mechanical (stone groundwood) Papermaking	Newsprint	414	19.8	1.0	29.9
Boise Cascade Canada Limited (BOISE)	Fort Frances	Rainy River/Lake of-the-Woods/ Arctic	Pulping: Kraft (bleached and unbleached) mechanical (stone groundwood)	Kraft pulp Groundwood specialties	1,049	12.2	7.8	72.2
Domtar Packaging/ Kraft Paper and Board Division Red Rock Mill (DOMTAR)	Red Rock	Nipigon Bay/ Lake Superior	Pulping: Kraft (semi-bleached) mechanial (groundwood) Papermaking	Kraft linerboard Newsprint	594	7.2	4.8	91
Great Lakes Forest Products Ltd. (GLFP)	Dryden	Wabigoon River/ English River/ Arctic	Pulping: Kraft (bleached & unbleached) Papermaking	Kraft pulp Kraft specialty papers	573	14.2	5.3	113.9
Great Lakes Forest Products Ltd. (GLFPTB)	Thunder Bay	Kaministikwia R./ Lake Superior	Pulping: Kraft (bleached & semi-bleached) sulphite, mechanical (stone groundwood)	Kraft pulp Sulphite pulp Newsprint	1,964	81.9	12.3	248
James River Marathon Limited (JR) (formerly: American Can Canada Inc.)	Marathon	Lake Superior	Pulping: Kraft (bleached)	Kraft pulp	393	17.1	9.7	81.7
Kimberly-Clark of Canada Limited (KC)	Terrace Bay	Blackbird Creek/ Jackfish Bay/ Lake Superior	Pulping: Kraft (bleached)	Kraft pulp	785	32	6.58	122.6

* Information obtained from: i) "Ministry Pulp and Paper Status Report, Ontario Pulp and Paper Industry" - prepared by the Northwestern, Northeastern, West Central and Southeastern Regions and the Water Resources Branch (unpublished).
and ii) "Pulp and Paper Effluents in Ontario: The Toxicity Problem and Abatement Approaches" - C. Inniss, W.P. Suboch and O. Muller, Quality Protection Section, Water Resources Branch (unpublished).

**Name has been changed to: Provincial Papers, Division of Abitibi Price Inc.

TABLE 2: List of Parameters

Conductivity
pH
Chemical Oxygen Demand (COD)
Total Suspended Solids (TSS)
Total Dissolved Solids (TDS)
Total Solids (TS)
Biochemical Oxygen Demand (BOD_5)
Ammonia
Colour
Turbidity
Total Phosphorus (TP)
Total Kjeldahl Nitrogen (TKN)
Sodium (Na)
Chloride (Cl)
Sulphate
Dissolved Organic Carbon (DOC)
Reactive Phenolics
Tannins
Bacteria
Inorganic Trace Contaminants
Resin, Aromatic and Fatty Acids
Speciated Phenolics
Chlorophenols
Volatile Organohalides
PCB's and Organochlorine Pesticides
GC/MS
Acute Lethality (LC_{50})

TABLE 3: Summary of Inorganic Trace Contaminants in Final Mill Effluents

PARAMETER (UNITS)	N	CONCENTRATION RANGE	PWQO	N ABOVE PWQO	HIGHEST DILUTION REQUIRED TO MEET PWQO	ESTIMATED* DILUTION
Arsenic (mg/L)	18	<0.001 - 0.006	0.1	0	--	--
Cadmium (mg/L)	23	<0.0002 - 0.005	0.0002	10	1:25	a) 1:20, b) 1:9
Chromium (mg/L)	23	<0.02 - 0.21	0.1	2	1:2	--
Copper (mg/L)	23	<0.01 - 0.03	0.005	18	1:6	b) 1:9, c) 1:1000
Iron (mg/L)	21	0.33 - 4.3	0.3	21	1:14	b) 1:9
Nickel (mg/L)	18	<0.2 - 0.05	0.025	2	1:2	--
Zinc (mg/L)	23	<0.01 - 0.18	0.03	19	1:6	d) 1:7
Hydrogen Sulphide (mg/L)	24	<0.02 - 2.00	0.002	20	1:1000	b) 1:9
Cyanide (mg/L)	19	<0.001 - 0.045	0.005	1	1:9	e) 1:20

N = Number of samples

PWQO = Provincial Water Quality Objective

* = Calculated on the basis of conductivity, a conservative parameter

-- = Not available

a) = KC - at about 6km from point of discharge to Jackfish Bay

b) = APFW = at 150m from the breakwall outlet

c) = GLFPTB = at 9.5 km from point of discharge to Kaministikwia River

d) = APFP - at 600m from point of discharge to Thunder Bay Inner Harbour

e) = JR - at diffuser

TABLE 4: Summary of Resin and Fatty Acids in Final Mill Effluents

COMPOUND	N	CONCENTRATION RANGE (ug/L)	N ABOVE DETECTION	LC_{50}* (ug/L)	N ABOVE LC_{50}
Fatty Acids:					
Oleic	25	ND - 1,244	15	24,000	0
Linoleic	25	ND - 4,801	14	9,000	0
Resin Acids:					
Pimaric	25	ND - 1,795	19	800	1
Sandaracopimaric	25	ND - 3,183	19	900	2
Isopimaric	25	ND - 5,224	20	700	4
Abietic	25	ND - 15,810	22	1,100	10
Dehydroabietic	25	ND - 1,187	19	1,600	0

N = Number of samples

* = Concentration lethal to 50% of rainbow trout, (Tomlinson, 1980)

ND = Not detected

TABLE 5: Comparison of Trace Contaminant Compounds Identified in some of the Pulp and Paper Mill Effluents Examined in Ontario with Published Lists of Trace Contaminants of Concern

COMPOUNDS IDENTIFIED	(a) USEPA	(b) MOE	(c) GLWQA #1	(c) GLWQA #2	(d) P & P	(e) CPAR	(f) FOX RIVER
Abietic acid		X			X	X	X
Acetone						X	
Acetophenone							
Acetosyringone		X				X	
Acetovanillon		X				X	
Aldrin	X		X		X		X
Alicyclic hydrocarbons							
Aliphatic acids		X					
Aliphatic alcohols							
Aliphatic aldehydes							
Aliphatic amide							
Aliphatic diols							
Aliphatic ethers							
Aliphatic hydrocarbons							
Aliphatic ketones							
Aliphatic nitrile							
Alkyl benzenes							
Alkyl naphthalenes							
Aluminum							
Arachidic acid		X				X	
Arsenic	X	X			X		X
Benzaldehyde						X	
Benzaldehyde derivative							
Benzene	X	X	X		X	X	X
Benzenemethanol							
Benzenepropanoic acid							
Benzenepropanol							
Benzeneethanol							
Benzoic acid		X	X				
α-BHC	X	X		X	X		
β-BHC	X	X		X	X		
γ-BHC	X	X	X	X	X		
Bicyclo(3,3,1)nonane							

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1	GLWQA #2	P & P	CPAR	FOX RIVER
Bicyclo(3,3,1)nonanol							
Bicyclo(4,1,0)heptan-2-one							
Bicyclo(5,1,0)octane							
1,4-Bis(ethoxymethyl)cyclohexane							
Bis(2-ethylhexyl)phthalate	X	X			X		X
Borneol (+ isomer)						X	
Butanal							
Butanol*						X	
n-Butanol							
t-Butanol							
2-Butoxyethanol							
2-t-Butyl-3-cresol		X					
Cadmium	X	X		X	X		X
Camphene (+ isomers)						X	
Capric acid		X					
Camphor (+ isomer)						X	
Carbon disulphide		X	X				
Carbontetrachloride	X	X			X	X	X
Y-Chlordane	X		X		X		X
Chloro-alkyne							
(2-Chloro-2-butenyl)-benzene							
4-Chloro-2-methylpyrimidine							
4-Chloro-3-methylphenol		X					
Chlorodibromomethane	X	X			X		
Chloroform	X	X	X		X	X	X
Chromium	X	X		X			X
Cobalt							
Copper	X	X		X	X		X
o-Cresol		X	X			X	
Cyanide	X	X			X		X
Cyclohexanol derivative							
Cyclohexene carboxylic acid							
Cyclohexenol derivative							
Cyclohexenyl-ethanone							

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1	GLWQA #2	P & P	CPAR	FOX RIVER
pp-DDE	X				X		X
Decahydro-1,1,7-trimethyl-4-methylene-1H-cycloprop-(e)azulene							
Decahydro-5(hydroxy-3-methyl-3-pentenyl)-dimethyl-methylene-1-naphthalenemethanol							
Decahydro-methyl-1-methylene-propenyl-naphthalene							
2-(Decahydro-trimethyl-2-methylene-1-naphthalenyl) methyl-2,5-cyclohexadiene-1,4-dione							
Decahydrotetramethylnaphtho-(2,1-B)-furan-2(1H)-one							
Decahydrotrimethyl-4-methylene-1H-cycloprop(e)azulene							
Decahydrotrimethyl-9-methylene-1,4-methanoazulene							
Dehydroabietic acid		X			X	X	X
Di-n-butylphthalate	X	X		X	X		X
Dibenzothiophene							
Dichloroacetone							
Dichlorobromomethane	X	X			X		
Dichloroguaiacol		X				X	
Dichloromethoxybenzaldehyde							
Dichloromethoxyphenol		X					
Dichlorophenol	X1	X				X	
Dieldrin	X			X	X		X
Diethylphthalate	X	X			X	X	X
Dihydromethyl-indene							
Dihydronaphthalenes							
Dihydropentyl-furanone							
Dihydro-phenanthrylamine							
2,3-Dihydro-2-(4-hydroxy-3-methoxyphenyl)-5-3-hydroxy-1-propenyl-7-methoxy-benzofuran-methanol?		X					
Dihydro-3,4-bis-(4-hydroxy-3-methoxyphenyl) methyl-2(3H)furanone?		X					
9,10-Dihydro-3-nitro-2-phenanthrylamine							
4-(2,3-Dihydro-7-methoxy-3-methyl-5-(1-propenyl)-2-benzofuranyl)-2-methoxyphenol		X					

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1 #2	P & P	CPAR	FOX RIVER
3A/7A-Dihydro-7A-methyl-5(4H)-indanone						
N-(9-10-Dihydro-2-phenanthryl) acetamide						
3,4-Dihydroxy-3-methoxypropiophenone		X				
Dimethoxyphenol		X				
Dimethoxypropanol						
1,2-Dimethoxy-4(2-propenyl)-benzene						
Dimethoxybenzoic acid						
(2,2-Dimethoxyethyl) benzene						
Dimethoxypropyl benzenes						
6,6-Dimethyl-bicyclo(3,1,1)hept-2-ene-2-methanol						
Dimethyl disulphide					X	
1-(1,1-Dimethylethoxy)-6-methylcyclohexene						
(Dimethylethyl) formamide						
Dimethylhexadiene (+ isomers)						
Dimethylnaphthalene						
Dimethylphenol	X1	X				
Dimethylstyrene (+ isomers)						
Dimethylsulphide					X	
Dimethyltetrasulphide						
Dimethyltrisulphide						
2,7-Dimethyl-3(2H)-benzofuranone						
1-(1,4 Dimethyl-3-cyclohexenyl) ethanone						
4-(1,5-Dimethyl-3-oxohexyl)-1-cyclohexene carboxylic acid-methyl ester						
4-Dimethylaminobenzaldehyde						
Dimethylphthalate	X	X		X		
8,13-Epoxy-labd-14-ene						
Ester (from natural waxes)						
Ethanol					X	
α-Ethenyl-decahydro-tetramethyl-methylene-1-naphthalene propanol?						

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1	GLWQA #2	P & P	CPAR	FOX RIVER
1-Ethenyl-1-methyl-2,4-bis-isopropenyl-cyclohexane							
α-Ethenyl-decahydro-2-hydroxy-pentamethyl-1-naphthalene-propanol (+ isomer)							
7-Ethenyl-dodecahydro-tetramethyl-phenanthrene							
5-Ethenyl-tetrahydro-2-furanmethanol							
5-Ethenyl-trimethylfuranmethanol							
3-Ethenyl-dodecahydro-pentamethyl-1H-naphtho(2,1-B) pyran							
Ethoxybenzaldehyde							
Ethylbenzene	X	X	X			X	X
Ethylbenzenediol		X					
3-Ethyl-dodecahydro-pentamethyl-naphtho-pyran-one							
3-Ethyl-dodecahydro-pentamethyl-8H-naphtho(1,2-B) pyran-8-one							
Ethyl ester?							
Ethylphenol		X					
p-Ethylresorcinol		X					
Eugenol		X				X	
Fluoranthene	X	X			X		X
Furanylethanone							
1(2-Furanyl)ethanone							
Furfural		X	X			X	
Guaiacol (+ isomers)		X				X	
Hexachlorobenzene	X	X			X		
Hexachlorocyclopentadiene	X	X			X		
Hexahydro-tetramethyl-methano-naphthalene							
Hexanal							
Hexane							
Hexanol*							
Hexathiepane							
Homovanillic acid		X				X	
Hydrogen sulphide				X			
Hydroxybenzaldehyde		X				X1	

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1	GLWQA #2	P & P	CPAR	FOX RIVER
Hydroxybenzeneacetic acid		X					
Hydroxycyclohexanemethanol							
Hydroxycyclohexanone							
Hydroxymethoxybenzaldehydes		X					
Hydroxymethoxyethanone							
Hydroxyphenylbutanone		X					
1-(4-Hydroxy-3-methoxyphenyl)-2-propanone derivative							
4-Hydroxy-3-methyl-2-(2-propenyl)-2-cyclopenten-1-one							
Hydroxybenzothiazole							
Iron							
Isoborneol (+ isomer)							
Isobutanal							
Isomaltol?							
3-Isopentyl-dihydro-2,5-furandione							
Isophorone	X	X			X		X
Isopimaric acid		X			X	X	X
Isopropanol							
p-Isopropylbenzaldehyde							
4-Isopropylcyclohexanol							
2-Isopropylcyclohexanol							
2-Isopropyl-3-cresol		X					
7-Isopropylidene-bicyclo(4,1,0)heptane							
Lauric acid		X					
Lead	X	X			X		X
Levopimaric acid		X					
Limonene						X	
Linoleic acid		X			X	X	X
Linolenic acid		X			X	X	X
Manganese							
Mercury	X	X		X	X		X
Methoxypropenylphenol		X					
3-Methoxy-2-cyclopenten-1-one							
1-Methoxy-4-propenyl-benzene							
2-Methoxy-4-propyl-phenol		X					

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1 #2	P & P	CPAR	FOX RIVER
2-Methoxybenzenepropanol derivative						
2-Methoxypyridine						
Methyl acetate						
Methylbenzylalcohol						
Methylbutanal*						
Methylcyclopentanone						
Methylcyclopentenone						
Methyl-trimethylbenzoate						
Methyl-3-(phenylmethyl)benzoate						
Methyl esters*						
Methylethylbenzoic acid						
Methyl-ethyl ketone						
N-Methylformamide						
Methylfuran*					X1	
Methylindene						
Methyl-isobutyl ketone						
Methyl-isopropyl ketone						
Methylphenols		X				
Methylpyrrole*						
Methylthiophene*						
Methyl-(propenyl)-cyclohexanol						
3-Methyl-1,2-cyclopentanediol						
4-Methyl-1-isopropyl-3-cyclohexen-1-ol						
2-Methyl-1-methylene-3-propenyl-cyclopentane						
4-Methyl-1-propyl-3-cyclohexen-1-ol						
13-Methyl-13-vinyl-podocarp-7-en-3-one						
5-Methyl-2-(isopropenyl)-cyclohexanol (+ derivatives)						
6-Methyl-2-methylene-6(4-methyl-3-pentenyl)bicyclo-(3,3,1)heptane						
1-Methyl-4-(5-methyl-1-methylene-4-hexenyl)-cyclohexene						
1-Methyl-4-isopropenyl-cyclohexene						
2-Methyl-4-isopropenyl-2-cyclohexenone						
1-Methyl-4-isopropyl-cyclohexene						
1-Methyl-4-propyl-cyclohexene						

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1 #2	P & P	CPAR	FOX RIVER
2-Methyl-5-isopropenyl-2-cyclohexen-1-ol acetate						
2-Methyl-5-isopropyl-bicyclo(3,1,0)hexan-2-ol						
5-Methyl-5-phenyl-2-hexanone						
2-Methyl-5-propyl-1,3-cyclohexadiene						
2-Methyl-cyclopentane-1,3-dione						
Methyl-isopropenyl-benzene						
Methyl-isopropenyl-cyclohexanol						
Methylenechloride	X	X		X		
4-Methylene-1-isopropyl-bicyclo(3,1,0)hexan-3-ol						
4-Methylene-1-isopropyl-bicyclo(3,1,0)hexane						
Molybdenum						
Myristic acid		X			X	
Naphthalene	X	X	X	X		X
Naphthalene-methanol derivatives						
Naphthalene-one derivative						
Naphthalenepropanol derivative						
Naphthofuran-one derivative						
Neoabietic acid		X			X	
Nickel	X	X		X		X
4-Nitrophenol	X	X	X	X		X
N-Nitrosodiphenylamine	X			X		
Octahydro-methyl-2(1H)-naphthalenone						
Octahydro-hydroxy-trimethylnaphthalenone acetate						
Octahydro-tetramethyl-naphthalenemethanol						
Octahydrodimethyl-isopropylnaphthalenol						
Octahydronaphthalenone derivative						
Octahydrotetramethylmethanoazulene						
Oleic acid		X		X	X	X
Palmitic acid		X			X	X
Pentachloroacetone						
Pentachlorophenol	X	X	X	X	X	X
Pentanone*						
Pentene (+ isomer)						
Phthalic acid		X				
Phenanthrene carboxyaldehydes						

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1 #2	P & P	CPAR	FOX RIVER
Phenol (+ unidentified phenol derivatives)	X	X	X	X	X	X
Phenylbenzamine						
n-Phenylbenzamine		X				
Phenylbutanone						
Phenyl-ethanediol						
Phenylpropanol						
Phenylpropanone						
3-Phenyl-2-propenal						
4-Phenyl-3-buten-2-one						
2-(Phenylmethylene)-cyclohexanone						
Pimaric acid		X		X	X	X
α-Pinene					X	
Polychlorinated biphenyls (PCB's)	X	X	X	X		X
Polypropyleneglycol derivatives						
Propanol*					X	
n-Propanol						
Propenylphenol		X				
Propiovanillon		X				
7-Propylidene-bicyclo(4,1,0)heptane						
Resacetophenone + isomer		X				
Resin alcohol						
Resin aldehyde						
Salicylic acid		X				
Sandaracopimaric acid		X			X	
Silicone compound						
Stearic acid					X	X
Steroids		X				
Stigmastadieneone						
Stigmastadienol						
Stigmastenol						
Stigmastenone						
Styrene		X	X			
Sulphur						
Syringaldehyde		X				

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1	GLWQA #2	P & P	CPAR	FOX RIVER
Terpin hydrate							
α-Terpineol (+ isomers)						X	
Tetrachloroacetone							
Tetrachloroethylene	X	X			X		X
Tetrachloroguaiacol		X			X	X	X
2,3,4,5-Tetrachlorophenol		X				X	
2,3,5,6-Tetrachlorophenol		X				X	
Tetrahydro-hydroxy-dimethylbenzofuranone derivative							
Tetrahydro-hydroxy-dimethyl-isobenzofuranone							
Tetrahydro-isopropyl-pentamethylnaphthalene							
Tetrahydro-methyl-naphthalene							
Tetrahydrofuran							
Tetrahydrohexamethyl-s-indacene-1,7-dione							
Tetrahydrohydroxy-4(4-hydroxy-3-methoxy-phenyl) 7-methoxy-naphthofuran-1(3H)one							
Thiapentane							
Thiazolopyrimidine							
Thiophene						X	
Thiophenecarboxyaldehyde							
Toluene	X	X	X		X	X	X
Tributylphosphate							
1,1,1-Trichloroethane	X	X			X	X	X
Trichloroethylene	X	X			X		X
Trichloroguaiacol		X			X1	X	X1
2,3,4-Trichlorophenol		X	X			X	
2,4,5-Trichlorophenol		X	X			X	X
2,4,6-Trichlorophenol	X	X	X		X	X	X
Trimethoxybenzene							
(1,2,2-Trimethoxyethyl)-benzene							
1,3,3-Trimethyl-bicyclo(2,2,1)heptan-2-ol							
3,7,7-Trimethyl-bicyclo(4,1,0)heptane							
1,3,3-Trimethyl-bicyclo(3,1,1)heptan-2-one							
1,7,7-Trimethyl-bicyclo(2,2,1)heptan-2-one?							
2,6,6-Trimethyl-bicyclo(3,1,1)heptan-3-one							

TABLE 5: Cont'd

COMPOUNDS IDENTIFIED	USEPA	MOE	GLWQA #1 #2	P & P	CPAR	FOX RIVER
3,7,7-Trimethyl-bicyclo(4,1,0)hept-2-ene						
Trimethylcyclopentanone						
Trimethylcyclopentenone		X				
Trimethylphenol						
Trimethylquinolines						
1,3,3-Trimethyl-2-oxabicyclo(2,2,2)octane						
4,11,11-Trimethyl-8-methylene-bicyclo(7,2,0)undec-4-ene						
Triterpanes						
1,2,4-Trithiolane		X			X	
Vanillic acid		X				
Vanillin						
Veratrole		X	X	X		X
m-Xylene		X	X	X		X
o- or p-Xylene	X	X		X		X
Zinc						

a) - United States Environmental Protection Agency (USEPA); (Keith and Telliard 1979).
b) - Ontario Ministry of the Environment (MOE); (MOE 1982).
c) - Great Lakes Water Quality Agreement (GLWQA); (IJC 1978).
d) - (USEPA 1981).
e) - Committee on Pollution Abatement Research (CPAR) - List of compounds compiled specifically for this program, which were identified in pulp and paper mill process streams and published in a number of CPAR Project Reports.
f) - (Sullivan and Delfino 1982).
BHC - Hexachlorocyclohexane
* - Isomer unknown
? - Tentative identification
1 - Isomer specified

Table 6: Compounds Detected in Some of the Pulp and Paper Mill Effluents Examined in Ontario which were Identified by Chemical Formula Only

C6 H12		C11 H14 O2	
C6 H14		C11 H16	(Tetrahydronaphthalenes)
C7 H4 O2 Cl4	(Phenol derivative)	C12 H16	
C7 H10 O2		C12 H16	(Tetrahydronaphthalenes)
C7 H16		C13 H18	(Tetrahydronaphthalenes)
C8 H8 O3		C15 H24	
C8 H18		C15 H24	(Naphthalene derivatives)
C9 H8 O		C15 H26 O	
C9 H8 O2		C18 H22	
C9 H10 O4		C20 H22 O6	
C9 H12		C20 H28 O	
C9 H14		C20 H28 O	(Phenanthrene carboxaldehyde)
C10 H12 O2	(Phenol derivative)	C20 H30 O	
C10 H12 O3		C20 H30 O2	
C10 H14		C20 H32	
C10 H14 O		C20 H34 O	(Naphthalene derivative)
C10 H14 O2		C20 H34 O2	
C10 H14 O2	(Phenol derivative)	C21 H30 O2	(Phenanthrene derivative)
C10 H16		C21 H32 O2	(Cyclohexane carboxylic acid derivative)
C10 H16 O		C22 H42 O4	(Hexanedioic acid esters)
C10 H18			
C10 H18 O			
C10 H20 O			
C10 H22 O3			
C10 H26 O			

TABLE 7: Classification and Possible Sources of Trace Contaminants Found in Some of the Pulp and Paper Mill Effluents Examined in Ontario

1. Terpenes & Associated Compounds

- Bicyclo(3,3,1)nonane
- Bicyclo(3,3,1)nonanol
- Bicyclo(4,1,0)heptan-2-one
- Bicyclo(5,1,0)octane
- 1,4-Bis(ethoxymethyl)cyclohexane
- Borneol (+ isomer)
- Camphene (+ isomers)
- Camphor (+ isomer)
- Cyclohexanol derivative
- Cyclohexene carboxylic acid
- Cyclohexenol derivative
- Cyclohexenyl-ethanone
- Decahydro-1,1,7-trimethyl-4-methylene-1H-cycloprop-(e)azulene
- Decahydro-5(hydroxy-3-methyl-3-pentenyl)-dimethyl-methylene-1-naphthalenemethanol
- Decahydro-methyl-1-methylene-propenyl-naphthalene
- 2-(Decahydro-trimethyl-2-methylene-1-naphthalenyl)methyl-2,5-cyclohexadiene-1,4-dione
- Decahydrotetramethylnaphtho-(2,1-B)-furan-2(1H)-one
- Decahydrotrimethyl-4-methylene-1H-cycloprop(e)azulene
- Decahydrotrimethyl-9-methylene-1,4-methanoazulene
- 6,6-Dimethyl-bicyclo(3,1,1)hept-2-ene-2-methanol
- 1-(1,1-Dimethylethoxy)-6-methylcyclohexene
- 1-(1,4 Dimethyl-3-cyclohexenyl) ethanone
- 4-(1,5-Dimethyl-3-oxohexyl)-1-cyclohexene carboxylic acid-methyl ester
- 8,13-Epoxy-labd-14-ene
- α-Ethenyl-decahydro-2-hydroxy-pentamethyl-1-naphthalene-propanol (+ isomer)
- α-Ethenyl-decahydro-tetramethyl-methylene-1-naphthalene propanol?
- 7-Ethenyl-dodecahydro-tetramethyl-phenanthrene
- 1-Ethenyl-1-methyl-2,4-bis-isopropenyl-cyclohexane
- 3-Ethenyl-dodecahydro-pentamethyl-1H-naphtho(2,1-B)pyran
- 5-Ethenyl-trimethylfuranmethanol
- 3-Ethyl-dodecahydro-pentamethyl-naphtho-pyran-one
- 3-Ethyl-dodecahydro-pentamethyl-8H-naphtho(1,2-B)pyran-8-one
- Hexahydro-tetramethyl-methano-naphthalene

Table 7: (Cont'd)

1. Terpenes & Associated Compounds (cont'd)

Hydroxycyclohexanemethanol
Hydroxycyclohexanone
4-Hydroxy-3-methyl-2-(2-propenyl)-2-cyclopenten-1-one
Isoborneol (+ isomer)
4-Isopropylcyclohexanol
2-Isopropylcyclohexanol
7-Isopropylidene-bicyclo(4,1,0)heptane
Limonene
3-Methoxy-2-cyclopenten-1-one
1-Methoxy-4-propenyl-benzene
Methylcyclopentanone
Methylcyclopentenone
Methyl-(propenyl)-cyclohexanol
4-Methyl-1-isopropyl-3-cyclohexen-1-ol
2-Methyl-1-methylene-3-propenyl-cyclopentane
4-Methyl-1-propyl-3-cyclohexen-1-ol
13 -Methyl-13-vinyl-podocarp-7-en-3-one
5-Methyl-2-(isopropenyl)-cyclohexanol (+ derivatives)
6-Methyl-2-methylene-6(4-methyl-3-pentenyl)bicyclo-(3,3,1)heptane
1-Methyl-4-(5-methyl-1-methylene-4-hexenyl)-cyclohexene
1-Methyl-4-isopropenyl-cyclohexene
2-Methyl-4-isopropenyl-2-cyclohexenone
1-Methyl-4-isopropyl-cyclohexene
1-Methyl-4-propyl-cyclohexene
2-Methyl-5-isopropenyl-2-cyclohexen-1-ol acetate
2-Methyl-5-isopropyl-bicyclo(3,1,0)hexan-2-ol
2-Methyl-5-propyl-1,3-cyclohexadiene
2-Methyl-cyclopentane-1,3-dione
Methyl-isopropenyl-benzene
Methyl-isopropenyl-cyclohexanol
4-Methylene-1-isopropyl-bicyclo(3,1,0)hexan-3-ol
4-Methylene-1-isopropyl-bicyclo(3,1,0)hexane
Naphthalene-methanol derivatives
Naphthalene-one derivative
Naphthalenepropanol derivative
Naphthofuran-one derivative
Octahydro-methyl-2(1H)-naphthalenone
Octahydro-hydroxy-trimethylnaphthalenone acetate

Table 7: (Cont'd)

1. Terpenes & Associated Compounds (Cont'd)
   - Octahydro-tetramethyl-naphthalenemethanol
   - Octahydrodimethyl-isopropylnaphthalenol
   - Octahydronaphthalenone derivative
   - Octahydrotetramethylmethanoazulene
   - α-Pinene
   - 7-Propylidene-bicyclo(4,1,0)heptane
   - Terpin hydrate
   - α-Terpineol (+ isomers)
   - Tetrahydro-isopropyl-pentamethylnaphthalene
   - 1,3,3-Trimethyl-bicyclo(2,2,1)heptan-2-ol
   - 3,7,7-Trimethyl-bicyclo(4,1,0)heptane
   - 1,3,3-Trimethyl-bicyclo(3,1,1)heptan-2-one
   - 1,7,7-Trimethyl-bicyclo(2,2,1)heptan-2-one?
   - 2,6,6-Trimethyl-bicyclo(3,1,1)heptan-3-one
   - 3,7,7-Trimethyl-bicyclo(4,1,0)hept-2-ene
   - Trimethylcyclopentanone
   - Trimethylcyclopentenone
   - 1,3,3-Trimethyl-2-oxabicyclo(2,2,2)octane
   - 4,11,11-Trimethyl-8-methylene-bicyclo(7,2,0)undec-4-ene
   - Triterpanes

2. Products of Chlorination
   - (2-Chloro-2-butenyl)-benzene
   - 4-Chloro-2-methylpyrimidine
   - 4-Chloro-3-methylphenol
   - Chloro-alkyne
   - Chlorodibromomethane
   - Chloroform
   - Dichloroacetone
   - Dichlorobromomethane
   - Dichloroguaiacol
   - Dichloromethoxybenzaldehyde
   - Dichloromethoxyphenol
   - Dichlorophenol
   - Hexachlorobenzene
   - Hexachlorocyclopentadiene
   - Pentachloroacetone
   - Pentachlorophenol

2. Products of Chlorination (Cont'd)
   - Tetrachloroacetone
   - Tetrachloroguaiacol
   - 2,3,4,5-Tetrachlorophenol
   - 2,3,5,6-Tetrachlorophenol
   - Trichloroguaiacol
   - 2,3,4-Trichlorophenol
   - 2,4,5-Trichlorophenol
   - 2,4,6-Trichlorophenol

3. Industrial Solvents and Additives
   - Acetone
   - Benzene
   - Bis(2-ethylhexyl)phthalate
   - Butanal
   - Butanol*
   - n-Butanol
   - t-Butanol
   - 2-Butoxyethanol
   - Carbontebrachloride
   - Chloroform
   - Di-n-butylphthalate
   - Diethylphthalate
   - (Dimethylethyl) formamide
   - Ethanol
   - Ethylbenzene
   - Isophorone
   - Isopropanol
   - Methyl acetate
   - Methyl-ethyl ketone
   - N-Methylformamide
   - Methyl-isobutyl ketone
   - Methyl-isopropyl ketone
   - Methylenechloride
   - 4-Nitrophenol
   - N-Nitrosodiphenylamine
   - Phenylbenzamine
   - n-Phenylbenzamine

Table 7: (Cont'd)

3. Industrial Solvents and Additives (Cont'd)
   - Polypropyleneglycol derivatives
   - Propanol*
   - n-Propanol
   - Silicone compound
   - Tetrachloroethylene
   - Tetrahydrofuran
   - Toluene
   - Tributylphosphate
   - 1,1,1-Trichloroethane
   - Trichloroethylene
   - m-Xylene
   - o- or p-Xylene

4. Lignin Degradation Products and Natural Products
   - Acetophenone
   - Acetosyringone
   - Acetovanillon
   - Alkyl benzenes
   - Benzaldehyde
   - Benzaldehyde derivative
   - Benzenemethanol
   - Benzenepropanoic acid
   - Benzenepropanol
   - Benzeneethanol
   - Benzoic acid
   - 2-t-Butyl-3-cresol
   - o-Cresol
   - Dihydropentyl-furanone
   - 2,3-Dihydro-2-(4-hydroxy-3-methoxyphenyl)-5-3-hydroxy-1-propenyl-7-methoxy-benzofuran-methanol?
   - Dihydro-3,4-bis-(4-hydroxy-3-methoxyphenyl) methyl-2(3H)furanone?
   - 4-(2,3-Dihydro-7-methoxy-3-methyl-5-(1-propenyl)-2-benzofuranyl)-2-methoxyphenol
   - 3,4-Dihydroxy-3-methoxypropiophenone
   - Dimethoxyphenol
   - Dimethoxypropanol
   - 1,2-Dimethoxy-4(2-propenyl)-benzene
   - Dimethoxybenzoic acid

Table 7: (Cont'd)

4. Lignin Degradation Products and Natural Products (Cont'd)

(2,2-Dimethoxyethyl) benzene
Dimethoxypropyl benzenes
Dimethylphenol
2,7-Dimethyl-3(2H)-benzofuranone
5-Ethenyl-tetrahydro-2-furanmethanol
Ethoxybenzaldehyde
Ethylbenzenediol
Ethylphenol
p-Ethylresorcinol
Eugenol
Furanylethanone
1(2-Furanyl)ethanone
Furfural
Guaiacol (+ isomers)
Hexanal
Homovanillic acid
Hydroxygenzaldehyde
Hydroxybenzeneacetic acid
Hydroxymethoxybenzaldehydes
Hydroxymethoxyethanone
Hydroxyphenylbutanone
1-(4-Hydroxy-3-methoxyphenyl)-2-propanone derivative
Isobutanal
Isomaltol?
3-Isopentyl-dihydro-2,5-furandione
p-Isopropylbenzaldehyde
2-Isopropyl-3-cresol
Methoxypropenylphenol
2-Methoxy-4-propyl-phenol
2-Methoxybenzenepropanol derivative
Methylbenzylalcohol
Methylbutanal*
Methyl-trimethylbenzoate
Methyl-3-(phenylmethyl)benzoate
Methylethylbenzoic acid
Methylfuran*
Methylphenols
3-Methyl-1,2-cyclopenthanediol
5-Methyl-5-phenyl-2-hexanone
Pentanone*
Phthalic acid
Phenol (+ unidentified phenol derivatives)
Phenylbutanone
Phenyl-ethanendiol
Phenylpropanol
Phenylpropanone
3-Phenyl-2- propenal
4-Phenyl-3-buten-2-one
2-(Phenylmethylene)-cyclohexanone
Propenylphenol
Propiovanillon
Resacetophenone + isomer
Salicylic acid
Steroids
Stigmastadieneone
Stigmastadienol
Stigmastenol
Stigmastenone
Syringaldehyde
Tetrahydro-hydroxy-dimethylbenzofuranone derivative
Tetrahydro-hydroxy-dimethyl-isobenzofuranone
Tetrahydrohydroxy-4(4-hydroxy-3-methoxy-phenyl)7-methoxy-naphthofuran-1(3H)one
Trimethoxybenzene
(1,2,2-Trimethoxyethyl)-benzene
Trimethylphenol
Trimethylquinolines
Vanillic acid
Vanillin
Veratrole

Table 7: (Cont'd)

5. Resin Acids and Associated Compounds
   - Abietic acid
   - Dehydroabietic acid
   - Isopimaric acid
   - Levopimaric acid
   - Neoabietic acid
   - Pimaric acid
   - Resin alcohol
   - Resin aldehyde
   - Sandaracopimaric acid

6. Fatty Acids
   - Aliphatic acids
   - Arachidic acid
   - Capric acid
   - Lauric acid
   - Linoleic acid
   - Linolenic acid
   - Myristic acid
   - Oleic acid
   - Palmitic acid
   - Stearic acid

7. Fatty Alcohols
   - Aliphatic alcohols
   - Aliphatic diols
   - Hexanol*

8. Hydrocarbons
   - Alicyclic hydrocarbons
   - Aliphatic hydrocarbons
   - Dimethylhexadiene (+ isomers)
   - Hexane
   - Pentene (+ isomer)

9. Pesticides
   - Aldrin
   - α-BHC
   - β-BHC
   - γ-BHC
   - γ-Chlordane
   - pp-DDE
   - Dieldrin
   - Hexachlorobenzene
   - Pentachlorophenol

10. Metals and Inorganics
    - Aluminum
    - Arsenic
    - Cadmium
    - Chromium
    - Cobalt
    - Copper
    - Cyanide
    - Iron
    - Lead
    - Manganese
    - Mercury
    - Molybdenum
    - Nickel
    - Zinc

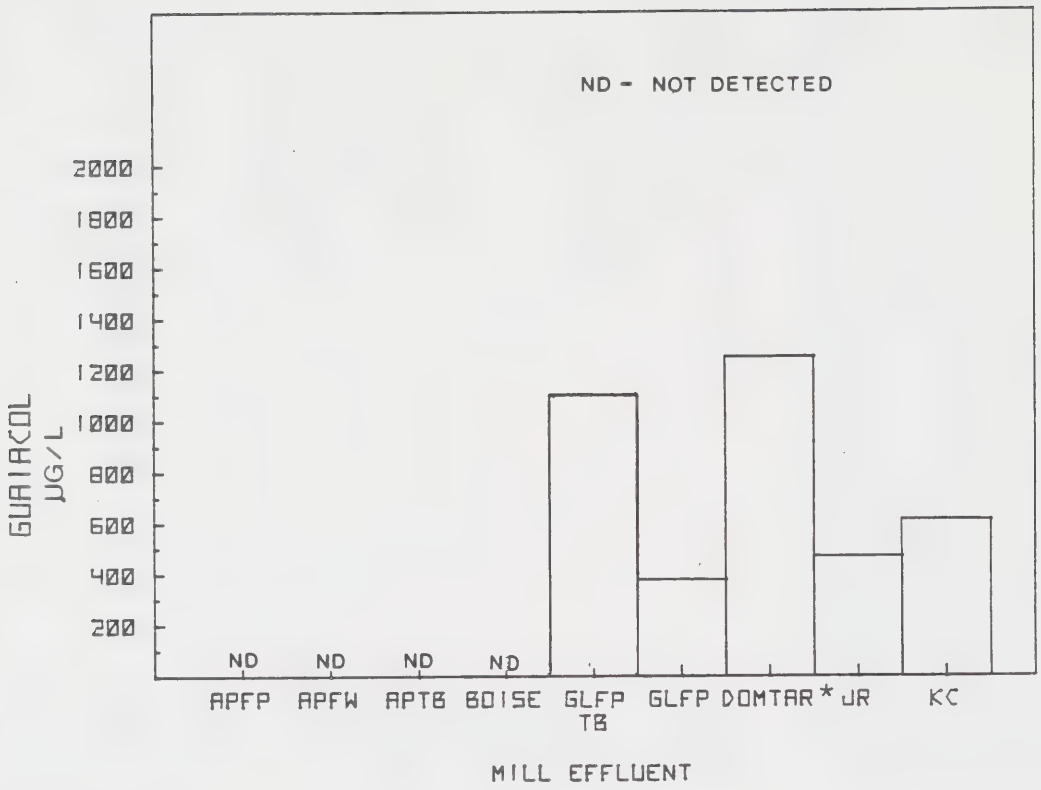
11. Products of Sulphite Process and Sulphur Cycle Intermediates
    - Carbon disulphide
    - Dimethyl disulphide
    - Dimethylsulphide
    - Dimethyltetrasulphide
    - Dimethyltrisulphide
    - Hexathiepane
    - Hydrogen sulphide
    - Sulphur
    - Thiapentane
    - 1,2,4-Trithiolane

Table 7: (Cont'd)

12. Miscellaneous Organic Compounds

- Aliphatic aldehydes
- Aliphatic amide
- Aliphatic ethers
- Aliphatic ketones
- Aliphatic nitrile
- Alkyl naphthalenes
- Dibenzothiophene
- Dihydromethyl-indene
- Dihydronaphthalenes
- Dihydro-phenanthrylamine
- 9,10-Dihydro-3-nitro-2-phenanthrylamine
- 3A/7A-Dihydro-7A-methyl-5(4H)-indanone
- N-(9-10-Dihydro-2-phenanthryl) acetamide
- Dimethylnaphthalene
- Dimethylstyrene (+ isomers)
- 4-Dimethylaminobenzaldehyde
- Dimethylphthalate
- Ester (from natural waxes)
- Ethyl ester?
- Fluoranthene
- Hydroxybenzothiazole
- 2-Methoxypyridine
- Methyl esters*
- Methylindene
- Methylpyrrole*
- Methylthiophene*
- Naphthalene
- Pnenanthrene carboxyaldehydes
- Polychlorinated biphenyls (PCB's)
- Styrene
- Tetrahydro-methyl-naphthalene
- Tetrahydrohexamethyl-s-indacene-1,7-dione
- Thiazolopyrimidine
- Thiophene
- Thiophenecarboxyaldehyde

* - Isomer unknown
? - Tentative identification of compound
BHC - Hexachlorocyclohexane



* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

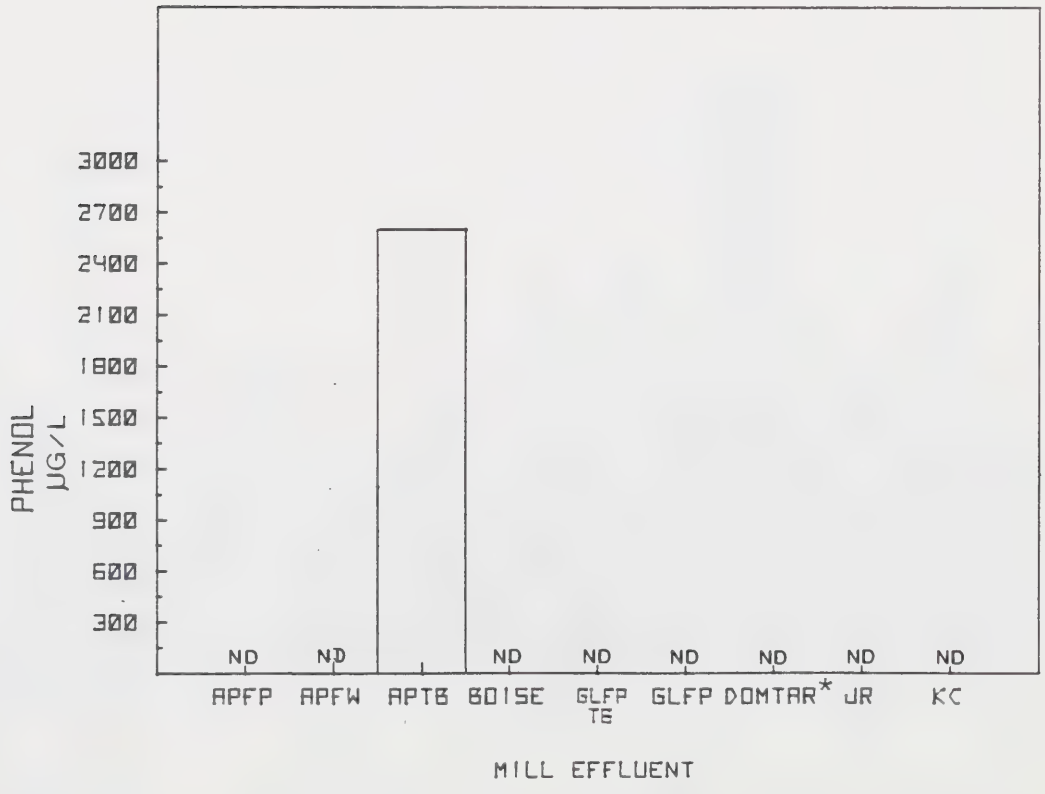


Figure 1 – Concentration of Guaiacol & Phenol in Final Mill Effluents

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

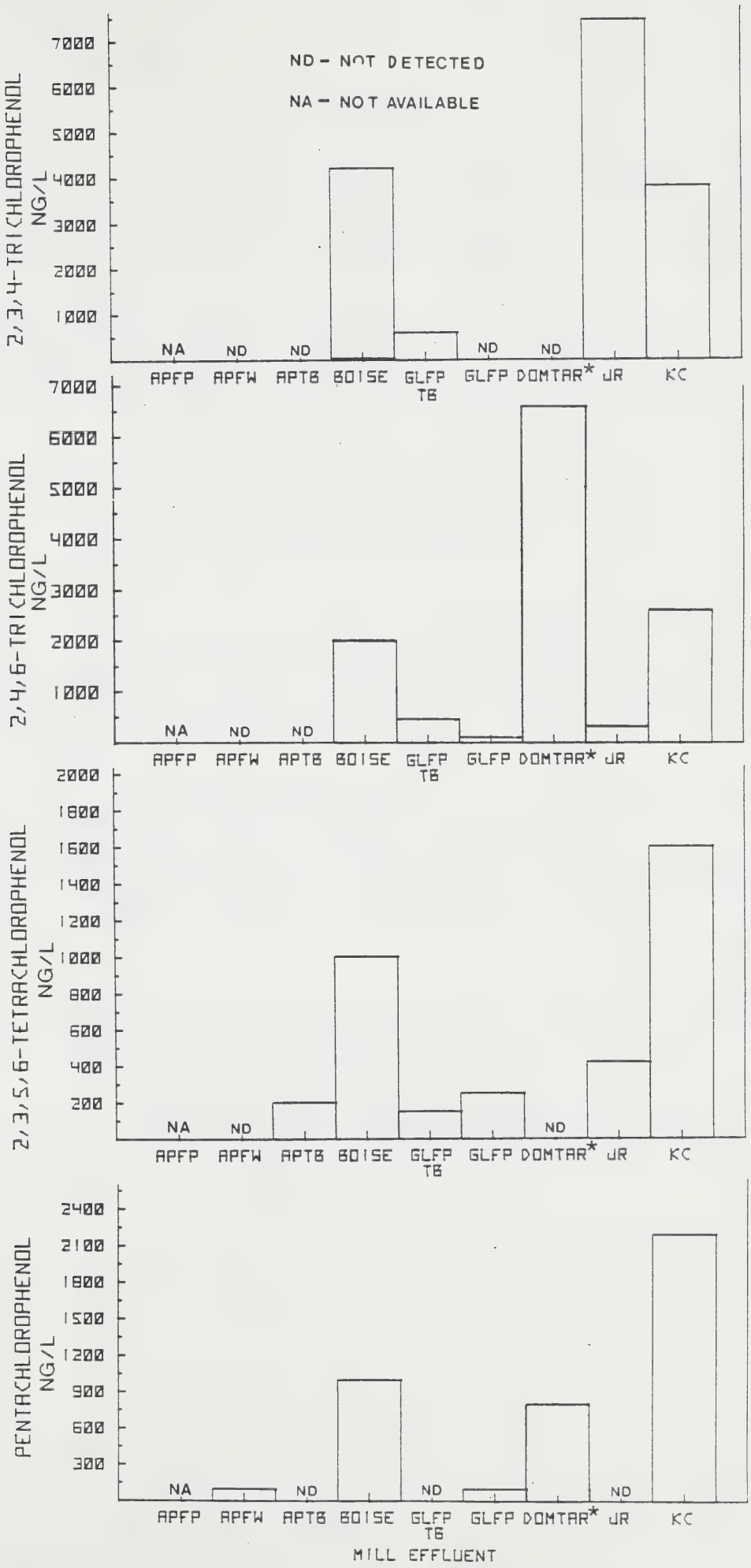


Figure 2 – Concentration of Chlorophenols in Final Mill Effluents

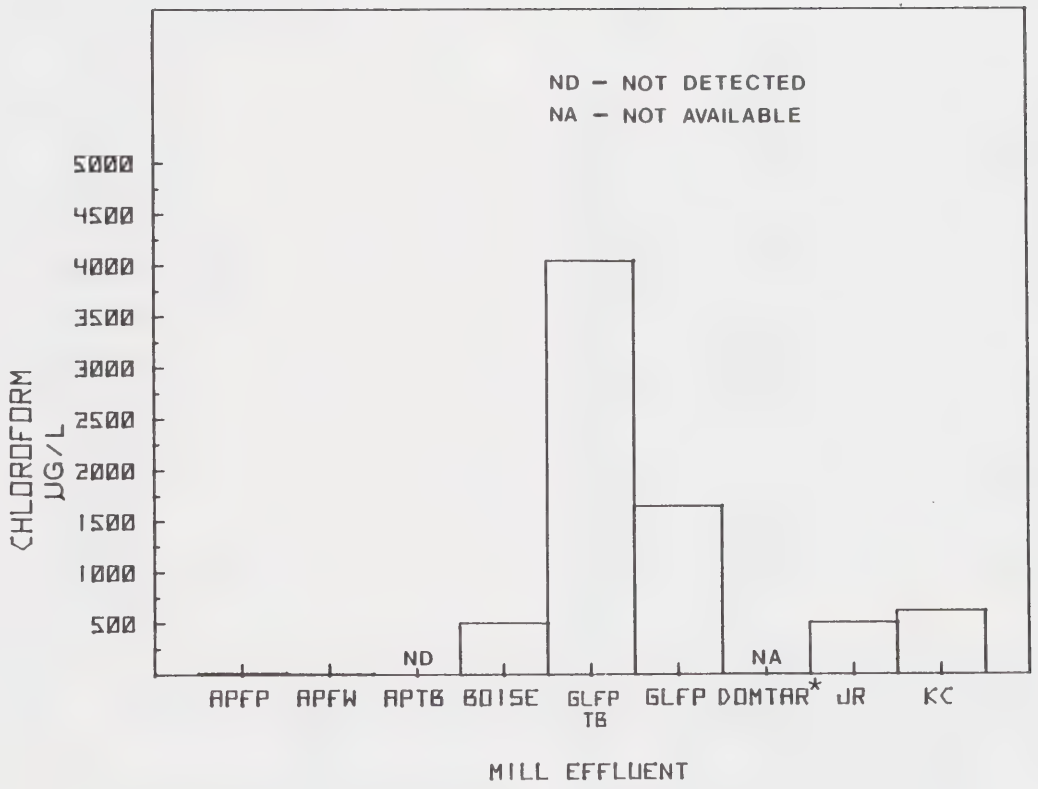


Figure 3 – Concentration of Chloroform in Final Mill Effluents

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

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APPENDIX A

APPENDIX A

SAMPLE COLLECTION

SAMPLE COLLECTION

At the start of the program both grab and composite samples were collected. Effluent was collected in plastic buckets for samples designated for metal analyses and stainless steel or glass containers were used for the remainder of the samples. Effluents were then transferred to individual sample bottles and treated with preservative as required. Composite samples were collected by an Isco sampler in plastic-lined 45 gallon drums.

During the course of the program in order to reduce contamination, minimize sample variability and facilitate sampling, the collection of composite samples was discontinued. Only grab samples were collected, in designated sample bottles, by dipping the sample bottle directly into the effluent stream using a "glug-glug" or bacteriological sampling pole. The samples were collected and treated as described below.

1. Discrete* Samples for the Toronto Lab

   i) Fill one, 1 L bottle and add 3 NaOH pellets; label "Cyanide" (CN).

   ii) Fill one 1 L glass bottle; adjust pH to 10-11 with 5% sodium bicarbonate or one NaOH pellet; check pH with pH sticks, then add 2N zinc acetate (approximately 2 mL are needed) drop by drop, until a white precipitate forms; label "Sulphides".

   iii) Fill up to the label only, one 150 mL sodium thiosulphate treated, glass Bacti bottle; label "Sulphate Reducers"; store at 4°C and ship to the Lab on the same day.

   iv) Fill to the top a 150 mL glass bottle (with foil-lined cap); label "Volatile Organohalides".

   v) Fill to the top a 1 L solvent-rinsed glass, PCB bottle (with foil-lined cap); label "GC/MS - Grab Sample" and ship refrigerated (4°C).

*Note: These samples are to be collected only once per day during the last sampling session.

2. Composite Samples for the Toronto Lab

Use a composite "Isco" sampler or composite samples directly in designated sample bottles by adding specified volumes of effluent to each bottle, at intervals, over a period of time, until the whole bottle is filled. Label the bottle as a "composite" sample and maintain at $4^{o}C$ storage throughout the whole sampling process.

i) Fill to the top two, 1 L solvent-rinsed glass, PCB bottles (with foil-lined caps); label "GC/MS - Composite sample" and ship at $4^{o}C$.

* ii) Fill up to the line only, a 1 L solvent-rinsed glass, PCB bottle (with foil-lined cap); label "PCB-OC Scan".

* iii) Fill up to the line only, a 1 L solvent-rinsed, PCB bottle (with teflon-lined cap); add approximately 2 mL of phosphoric acid/1 L of sample to bring pH to 2.0; label the bottle "Chlorophenol Scan".

*NOTE: Collect two, 1 L bottles of control water (i.e. raw water from intake pipe at the mill) per batch of samples submitted for PCB-OC and chlorophenol scans. Sampling requirements are the same as described in ii) and iii).

iv) Fill up to the label only, two, 1 L glass bottles (with teflon or foil caps); adjust to pH 2 with phosphoric acid (approximately 2 mL/1 L); label one bottle "Phenolics Speciated", and the other "Resin, Aromatic and Fatty Acids Scan".

v) Fill up to the label, a 150 mL glass bottle (with foil-lined cap); label "Tannins".

vi) Fill one, 150 mL plain, glass Bacti bottle (with a polyseal or foil cap); label "Dissolved Organic Carbon" and "Sulphate".

vii) Fill up to the label only, one, 150 ml preservative-rinsed, glass, special "phenolics" bottle (with new cap); shake well; label "Total Phenolics" store upright at $4^{o}C$ and ship same day.

3. Composite Samples for the Thunder Bay Lab

i) Fill a 1 L glass bottle marked "Total Suspended Solids (TSS) and Total Dissolved Solids (TDS)".

ii) Fill a 1 L glass bottle marked "Chemical Oxygen Demand (COD)", "Conductivity", "Colour Apparent", "Turbidity" and "BOD_5", "Total Phosphorus (TP)", "Total Kjeldahl Nitrogen (TKN)", "Chloride", "Sodium (Na)" and "pH".

iii) Fill a 150 mL glass bottle (with polyseal cap) marked "Total Mercury"; preserve with nitric acid and potassium dichromate or potassium permanganate.

iv) Fill a 500 mL acid-washed plastic Nalgene bottle (with plastic cap) and preserve with 20 drops of concentrated nitric acid; label "Metals + As".

4. Discrete Samples for the Thunder Bay Lab

i) Fill up to the line only, two, 150 mL sodium thiosulphate treated Bacti bottles; label one bottle "Total and Fecal Coliforms" and the other "Heterotrophs and Pseudomonas".

ii) Fill a 150 mL glass bottle marked "Ammonia (NH_3)"; and store at $4^{o}C$.

5. Discrete Samples for the Mobile Toxicity Lab, Thunder Bay

Collect 15 to 25 gallons of effluent for fish toxicity testing in 5 gallon pails lined with food-grade resin polyethylene bags.

PLEASE NOTE:

It is important that samples requiring refrigeration be shipped in coolers containing ice packs or ice cubes stored in plastic bags. Samples designated for the Toronto lab should be shipped out by air on the same day as collected. Request airlines to refrigerate samples on arrival in Toronto and to deliver them to the MOE lab as soon as possible.

APPENDIX B

APPENDIX B

CHARACTERIZATION OF PULP AND PAPER MILL EFFLUENTS IN ONTARIO

Appendix B (cont'd)

PAGE

Appendix B (cont'd)

APPENDIX B (cont'd)

APPENDIX B (cont'd)

APPENDIX B (cont'd)

PAGE

APPENDIX B (cont'd)

APPENDIX B (cont'd)

APPENDIX B (cont'd)

TABLE:1 PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERIZATION OF ABITIBI PRICE FINE PAPERS, PORT ARTHUR DIVISION, EFFLUENTS.

	PHYSICAL,CHEMICAL AND BIOLOGICAL CHARACTERIZATION																			
DATE SAMPLED/ SAMPLE DESCRIPTION	DOC	TANNINS	SULPHATE	REACTIVE PHENOLICS	BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	COD	COLOUR	CONDUCTIVITY	TURBIDITY	TP	TKN	CHLORIDE	SODIUM	PH	AMMONIA	(1) LC50
JULY 7,1982:																			
GROUNDWOOD EFFLUENT	17.0	5	6.4	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100
PAPER MILL EFFLUENT	78.0	5	191.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NL
AUGUST 4,1982:																			
FINAL EFFLUENT	18.2	4	20.5	<1.0	55	280	25	255	80	39	315	33	0.09	1.6	6.8	13	7.0	0.02	--
ALL CONCENTRATIONS	MG/L	MG/L	MG/L	UG/L	MG/L	MG/L	MG/L	MG/L	MG/L	HZ	US/CM	FTU	MG/L	MG/L	MG/L	MG/L	SU	MG/L	%

-- -NOT AVAILABLE
HZ -HAZEN UNITS
US/CM -MICROSIEMENS/CM
FTU -FORMAZIN TURBIDITY UNITS
SU -STANDARD UNITS
NL -NON LETHAL
DOC -DISSOLVED ORGANIC CARBON
BOD -BIOLOGICAL OXYGEN DEMAND
COD -CHEMICAL OXYGEN DEMAND
TP -TOTAL PHOSPHORUS
TKN -TOTAL KJELDAHL NITROGEN
(1) -FISH BIOASSAY-% CONCENTRATION LETHAL TO 50% OF FISH IN 96 HOURS.
< -LESS THAN

TABLE:2 PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERIZATION OF ABITIBI PRICE INC., FORT WILLIAM DIVISION, EFFLUENTS.

PHYSICAL,CHEMICAL AND BIOLOGICAL CHARACTERIZATION

DATE SAMPLED/ SAMPLE DESCRIPTION	DOC	TANNINS	SULPHATE	REACTIVE PHENOLICS	BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	COD	COLOUR	CONDUCTIVITY	TURBIDITY	TP	TKN	CHLORIDE	SODIUM	PH	AMMONIA	(1) LC50
JULY 21,1982:																			
COMBINED FINAL EFFLUENT*	300	250	183	300	360	1420	70	1350	1490	600	880	100	0.50	2.6	36	200	5.7	0.06	75
FINAL EFFLUENT**	284	200	162	212	290	1290	25	1265	960	397	875	100	1.30	5.3	31	200	6.0	0.04	NL
WOODROOM EFFLUENT	505	400	222	600	580	1760	130	1630	2204	1264	890	130	1.40	5.8	35	190	5.3	0.16	14
SCMP EFFLUENT	644	400	313	660	670	2980	245	2735	2910	707	1690	220	0.40	3.3	36	400	5.7	0.10	17
ALL CONCENTRATIONS	MG/L	MG/L	MG/L	UG/L	MG/L	MG/L	MG/L	MG/L	MG/L	HZ	US/CM	FTU	MG/L	MG/L	MG/L	MG/L	SU	MG/L	%

-- -NOT AVAILABLE
* -NO.1 & NO.2 LAGOON EFFLUENTS AND WOODROOM EFFLUENT
** -NO.1 & NO.2 LAGOON EFFLUENTS
SCMP -SEMI CHEMICAL MECHANICAL PULPING
HZ -HAZEN UNITS
US/CM -MICROSIEMENS/CM
FTU -FORMAZIN TURBIDITY UNITS
SU -STANDARD UNITS
NL -NON LETHAL
DOC -DISSOLVED ORGANIC CARBON
BOD -BIOLOGICAL OXYGEN DEMAND
COD -CHEMICAL OXYGEN DEMAND
TP -TOTAL PHOSPHORUS
TKN -TOTAL KJELDAHL NITROGEN
(1) -FISH BIOASSAY-% CONCENTRATION LETHAL TO 50% OF FISH IN 96 HOURS.

TABLE:3 PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERIZATION OF ABITIBI PRICE INC., THUNDER BAY DIVISION, EFFLUENTS AND MILL INTAKE WATER:

PHYSICAL,CHEMICAL AND BIOLOGICAL CHARACTERIZATION

DATE SAMPLED/ SAMPLE DESCRIPTION	BOD COD	TANNINS	SULPHATE	REACTIVE PHENOLICS	BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	COD	COLOUR	CONDUCTIVITY	TURBIDITY	TP	TKN	CHLORIDE	SODIUM	PH	AMMONIA	LC50 (1)
JUNE 3,1982:																			
FINAL EFFLUENT	8.5	300	--	260	540	2070	45	2025	2600	202	1095	--	.430	--	--	--	4.5	.05	15
JUNE 16,1982:																			
FINAL EFFLUENT	80	350	199	660	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14
JULY 21,1982:																			
FINAL EFFLUENT																			
SAMPLE #1	260	300	187	320	490	1790	35	1755	1940	245	625	61.00	.360	1.90	18	130	5.7	.02	34
SAMPLE #2	--	--	--	--	500	1780	40	1740	1960	232	635	65.00	--	--	17	130	5.5	--	--
SAMPLE #3	--	--	--	--	500	1760	50	1710	1900	231	630	64.00	--	--	17	130	5.5	--	--
SAMPLE #4	--	--	--	--	470	1760	50	1710	1730	180	635	66.00	--	--	16	130	5.3	--	--
MILL INTAKE WATER																			
SAMPLE #1	3.7	1.0	5.1	2.2	0.5	65	2	63	<10	6	107	.70	.006	.18	2.1	1.9	7.9	<.01	--
SAMPLE #2	--	--	--	--	0.1	90	2	88	<10	8	105	.60	--	--	2.1	1.8	8.0	--	--
SAMPLE #3	--	--	--	--	0.2	80	2	78	<10	5	105	.60	--	--	2.1	1.9	8.0	--	--
SAMPLE #4	--	--	--	--	0.1	50	1	49	<10	9	106	.55	--	--	2.1	1.9	8.0	--	--
JULY 22,1982:																			
FINAL EFFLUENT																			
SAMPLE #1	600	200	191	160	460	1570	50	1520	1630	197	620	60.00	.310	1.60	16	120	4.7	.02	36
SAMPLE #2	--	--	--	--	440	1620	40	1580	1630	193	620	59.00	--	--	17	130	4.7	--	--
SAMPLE #3	--	--	--	--	510	1760	40	1720	1960	197	645	58.00	--	--	18	140	4.6	--	--
SAMPLE #4	--	--	--	--	490	1760	40	1720	1940	198	660	60.00	--	--	19	140	4.5	--	--
MILL INTAKE WATER																			
SAMPLE #1	--	--	--	--	1.4	80	4	76	<10	6	107	50.00	.007	.35	--	--	7.6	<.01	--
SAMPLE #2	--	--	--	--	1.1	52	1	51	<10	6	107	.50	--	--	--	--	7.7	--	--
SAMPLE #3	--	--	--	--	1.2	60	1	59	<10	8	108	.55	--	--	--	--	7.6	--	--
SAMPLE #4	--	--	--	--	1.3	75	1	74	<10	7	108	.50	--	--	--	--	7.6	--	--
JULY 23,1982:																			
FINAL EFFLUENT																			
SAMPLE #1	380	200	238	205	430	1370	30	1340	1740	212	575	53.00	.340	1.60	15	110	5.0	.02	37
SAMPLE #2	--	--	--	--	400	1590	35	1555	1640	207	575	54.00	--	--	--	--	4.8	--	--
SAMPLE #3	--	--	--	--	400	1590	35	1555	1660	208	580	54.00	--	--	--	--	4.7	--	--
SAMPLE #4	--	--	--	--	490	2055	25	2030	2000	210	730	57.00	--	--	--	--	4.4	--	--
MILL INTAKE WATER																			
SAMPLE #1	--	--	--	--	1.1	70	1	69	35	7	106	.60	.004	.17	--	--	7.9	<.01	--
SAMPLE #2	--	--	--	--	0.9	50	1	49	25	6	106	.45	--	--	--	--	7.5	--	--
SAMPLE #3	--	--	--	--	1.0	70	1	69	20	7	105	.45	--	--	--	--	7.6	--	--
SAMPLE #4	--	--	--	--	0.9	90	1	89	20	9	104	.45	--	--	--	--	7.7	--	--
ALL CONCENTRATIONS	MG/L	MG/L	MG/L	UG/L	MG/L	MG/L	MG/L	MG/L	MG/L	HZ	US/CM	FTU	MG/L	MG/L	MG/L	MG/L	SU	MG/L	%

-- -NOT AVAILABLE
HZ -HAZEN UNITS
US/CM -MICROSIEMENS/CM
FTU -FORMAZIN TURBIDITY UNITS
SU -STANDARD UNITS

BOD -BIOLOGICAL OXYGEN DEMAND
COD -CHEMICAL OXYGEN DEMAND
TP -TOTAL PHOSPHORUS
TKN -TOTAL KJELDAHL NITROGEN
(1) -FISH BIOASSAY-% CONCENTRATION LETHAL TO 50% OF FISH IN 96 HOURS.
< -LESS THAN

TABLE:4 PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERIZATION OF BOISE CASCADE CANADA LIMITED, FORT FRANCES, EFFLUENTS.

	PHYSICAL,CHEMICAL AND BIOLOGICAL CHARACTERIZATION																		
DATE SAMPLED/ SAMPLE DESCRIPTION	DOC	TANNINS	SULPHATE	REACTIVE PHENOLICS	BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	COD	COLOUR	CONDUCTIVITY	TURBIDITY	TP	TKN	CHLORIDE	SODIUM	PH	AMMONIA	LC50 (1)
JULY 13,1982:																			(2)
FINAL EFFLUENT	180	150	128	380	120	1630	100	1530	850	2075	1930	8.6	1.3	4.3	445	340	6.6	0.06	81
SECONDARY LAGOON INFLUENT	230	200	76	1500	310	1690	65	1625	1040	2117	1860	2.7	1.6	4.5	197	380	10.4	0.50	57
SECONDARY LAGOON EFFLUENT	245	200	168	660	80	2640	75	2565	1010	3980	3520	0.9	1.9	7.0	905	660	6.9	0.14	>80
ALL CONCENTRATIONS	MG/L	MG/L	MG/L	UG/L	MG/L	MG/L	MG/L	MG/L	MG/L	HZ	US/CM	FTU	MG/L	MG/L	MG/L	MG/L	SU	MG/L	%

HZ -HAZEN UNITS
US/CM -MICROSIEMENS/CM
FTU -FORMAZIN TURBIDITY UNITS
SU -STANDARD UNITS
> -GREATER THAN
DOC -DISSOLVED ORGANIC CARBON
BOD -BIOLOGICAL OXYGEN DEMAND
COD -CHEMICAL OXYGEN DEMAND
TP -TOTAL PHOSPHORUS
TKN -TOTAL KJELDAHL NITROGEN
(1) -FISH BIOASSAY-% CONCENTRATION LETHAL TO 50% OF FISH IN 96 HOURS.
(2) -SPLIT SAMPLE

TABLE:5 PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERIZATION OF DOMTAR PACKAGING/KRAFT PAPER AND BOARD DIVISION RED ROCK MILL, EFFLUENTS AND MILL INTAKE WATER.

PHYSICAL,CHEMICAL AND BIOLOGICAL CHARACTERIZATION

DATE SAMPLED/ SAMPLE DESCRIPTION	DOC	TANNINS	SULPHATE	REACTIVE PHENOLICS	BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	COD	COLOUR	CONDUCTIVITY	TURBIDITY	TP	TKN	CHLORIDE	SODIUM	PH	AMMONIA	(1) LC50
JUNE 14,1982:																			
FINAL EFFLUENT*	--	50	--	1520	100	580	80	500	480	400	625	27	0.30	2.1	32.0	115	7.0	0.34	--
JULY 5,1982:																			
WOODROOM EFFLUENT																			
ALUM UNTREATED	680	400	66.6	1800	1000	5000	1690	3210	3780	2722	1523	35	3.70	16.0	15.0	17	3.7	0.08	3.3
ALUM TREATED	540	500	1140	600	1200	3650	2220	1430	5480	2824	294	36	3.40	17.0	14.0	17	5.4	0.12	3.9
JULY 17,1983:																			
FINAL EFFLUENT*	55	50	154	3350	130	780	65	715	460	434	745	51	0.36	2.0	89.0	120	7.0	0.82	84.
MILL INTAKE WATER	4	0	2.7	<0.4	0.4	120	3	117	3	13	131	2	0.01	0.3	1.4	2	7.8	0.34	NL
JULY 18,1983:																			
FINAL EFFLUENT*	86	50	141	2980	110	630	80	550	429	289	620	55	0.29	2.0	58.0	100	6.8	0.25	80(2) >100(3)
MILL INTAKE WATER	4	0	3.0	<0.2	0.7	100	1	99	8	15	124	3	0.01	0.2	1.3	2	7.9	0.01	NL
JULY 19,1983:																			
FINAL EFFLUENT*	41	50	116	3020	106	470	70	400	349	227	424	49	0.25	1.9	16.0	70	6.8	0.33	>100
MILL INTAKE WATER	3	0	3.1	<0.4	0.7	85	3	82	14	11	117	3	0.01	0.2	1.3	1	7.7	0.01	NL
JULY 20,1983:																			
FINAL EFFLUENT*	57	60	114	2360	120	530	90	440	413	347	454	48	0.25	1.6	18.0	80	7.1	0.15	78
MILL INTAKE WATER	4	1	3.1	0.8	0.9	110	6	104	6	15	119	2	0.01	0.2	1.3	2	7.7	0.01	NL
JULY 21,1983:																			
FINAL EFFLUENT*	75	60	140	3040	128	680	70	610	420	389	665	48	0.41	2.2	71.0	110	7.0	0.03	90
MILL INTAKE WATER	4	1	3.1	<0.6	0.7	85	2	83	1	14	127	2	0.01	0.2	1.4	2	7.8	0.02	NL
ALL CONCENTRATIONS	MG/L	MG/L	MG/L	UG/L	MG/L	MG/L	MG/L	MG/L	MG/L	HZ	US/CM	FTU	MG/L	MG/L	MG/L	MG/L	SU	MG/L	%

-- -NOT AVAILABLE
HZ -HAZEN UNITS
US/CM -MICROSIEMENS/CM
FTU -FORMAZIN TURBIDITY UNITS
SU -STANDARD UNITS
NL -NON LETHAL
DOC -DISSOLVED ORGANIC CARBON
BOD -BIOLOGICAL OXYGEN DEMAND
COD -CHEMICAL OXYGEN DEMAND
TP -TOTAL PHOSPHORUS
TKN -TOTAL KJELDAHL NITROGEN
(1) -FISH BIOASSAY-% CONCENTRATION LETHAL TO 50% OF FISH IN 96 HOURS.
(2) -GRAB SAMPLE
(3) -24-HOUR COMPOSITE SAMPLE
< -LESS THAN
> -GREATER THAN

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

TABLE:6 PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERIZATION OF GREAT LAKES FOREST PRODUCTS LIMITED, DRYDEN, EFFLUENT.

PHYSICAL,CHEMICAL AND BIOLOGICAL CHARACTERIZATION																				
DATE SAMPLED/ SAMPLE DESCRIPTION	DOC	TANNINS	SULPHATE	REACTIVE PHENOLICS	BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	COD	COLOUR	CONDUCTIVITY	TURBIDITY	TP	TKN	CHLORIDE	SODIUM	PH	AMMONIA	(1) LC50
AUGUST 23,1982: FINAL EFFLUENT	100	50	--	--	60	1060	55	1005	390	1120	1310	21	0.28	1.3	229	220	6.5	0.05	NL
ALL CONCENTRATIONS	MG/L	MG/L	MG/L	UG/L	MG/L	MG/L	MG/L	MG/L	MG/L	HZ	US/CM	FTU	MG/L	MG/L	MG/L	MG/L	SU	MG/L	%

-- -NOT AVAILABLE
HZ -HAZEN UNITS
US/CM -MICROSIEMENS
FTU -FORMAZIN TURBIDITY UNITS
SU -STANDARD UNITS
NL -NON LETHAL
DOC -DISSOLVED ORGANIC CARBON
BOD -BIOLOGICAL OXYGEN DEMAND
COD -CHEMICAL OXYGEN DEMAND
TP -TOTAL PHOSPHORUS
TKN -TOTAL KJELDAHL NITROGEN
(1) -FISH BIOASSAY-% CONCENTRATION LETHAL TO 50% OF FISH IN 96 HOURS.

TABLE:7 PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERIZATION OF GREAT LAKES FOREST PRODUCTS LIMITED, THUNDER BAY, EFFLUENT.

PHYSICAL,CHEMICAL AND BIOLOGICAL CHARACTERIZATION																					
DATE SAMPLED/ SAMPLE DESCRIPTION	DOC	TANNINS	SULPHATE	REACTIVE	PHENOLICS	BOD	TOTAL	SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	COD	COLOUR	CONDUCTIVITY	TURBIDITY	TP	TKN	CHLORIDE	SODIUM	PH	AMMONIA	LC50 (1)
JUNE 8,1982: FINAL EFFLUENT	60	400	162	2400		400	2440		110	2330	2160	1600	1750	11	0.78	2.9	309	373	6.3	0.05	26 (2)
ALL CONCENTRATIONS	MG/L	MG/L	MG/L	UG/L		MG/L	MG/L		MG/L	MG/L	MG/L	HZ	US/CM	FTU	MG/L	MG/L	MG/L	MG/L	SU	MG/L	%

HZ -HAZEN UNITS
US/CM -MICROSIEMENS/CM
FTU -FORMAZIN TURBIDITY UNITS
SU -STANDARD UNITS
DOC -DISSOLVED ORGANIC CARBON
BOD -BIOLOGICAL OXYGEN DEMAND
COD -CHEMICAL OXYGEN DEMAND
TP -TOTAL PHOSPHORUS
TKN -TOTAL KJELDAHL NITROGEN
(1) -FISH BIOASSAY-% CONCENTRATION LETHAL TO 50% OF FISH IN 96 HOURS.
(2) -SPLIT SAMPLE

TABLE:8 PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERIZATION OF JAMES RIVER MARATHON LTD., (FORMERLY: AMERICAN CAN CANADA INC.), EFFLUENTS.

PHYSICAL,CHEMICAL AND BIOLOGICAL CHARACTERIZATION

DATE SAMPLED/ SAMPLE DESCRIPTION	DOC	TANNINS	SULPHATE	REACTIVE PHENOLICS	BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	COD	COLOUR	CONDUCTIVITY	TURBIDITY	TP	TKN	CHLORIDE	SODIUM	PH	AMMONIA	LC50 (1)
JUNE 22,1982:																			
FINAL EFFLUENT	127	30	158	120	280	2140	230	1910	1200	2424	2450	1.7	0.410	1.80	469	630	9.8	0.15	87
MAIN MILL EFFLUENT	365	400	172	6400	140	1460	225	1235	780	--	1590	--	0.280	2.90	255	370	10.3	0.07	--
ACIDIC SEWER EFFLUENT	233	50	180	116	300	2080	11	2069	940	--	11900	--	2.400	1.10	1814	320	1.8	0.19	--
ALKALINE SEWER EFFLUENT	245	100	142	3400	70	1140	70	1070	370	--	1540	--	0.043	0.28	308	356	9.8	0.02	--
AUGUST 16,1982:																			(2)
FINAL EFFLUENT	185	100	--	2600	240	1410	30	1380	770	1306	1910	25.0	0.320	1.90	443	370	3.9	1.70	<20
ALL CONCENTRATIONS	MG/L	MG/L	MG/L	UG/L	MG/L	MG/L	MG/L	MG/L	MG/L	HZ	US/CM	FTU	MG/L	MG/L	MG/L	MG/L	SU	MG/L	%

-- -NOT AVAILABLE
HZ -HAZEN UNITS
US/CM -MICROSIEMENS/CM
FTU -FORMAZIN TURBIDITY UNITS
SU -STANDARD UNITS
< -LESS THAN
DOC -DISSOLVED ORGANIC CARBON
BOD -BIOLOGICAL OXYGEN DEMAND
COD -CHEMICAL OXYGEN DEMAND
TP -TOTAL PHOSPHORUS
TKN -TOTAL KJELDAHL NITROGEN
(1) -FISH BIOASSAY-% CONCENTRATION LETHAL TO 50% OF FISH IN 96 HOURS.
(2) -SPLIT SAMPLE

TABLE:9 PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERIZATION OF KIMBERLY-CLARK OF CANADA LIMITED, TERRACE BAY, EFFLUENTS AND MILL INTAKE WATER.

PHYSICAL,CHEMICAL AND BIOLOGICAL CHARACTERIZATION

DATE SAMPLED/ SAMPLE DESCRIPTION	DOC	TANNINS	SULPHATE	REACTIVE PHENOLICS	BOD	TOTAL SOLIDS	SUSPENDED SOLIDS	DISSOLVED SOLIDS	COD	COLOUR	CONDUCTIVITY	TURBIDITY	TP	TKN	CHLORIDE	SODIUM	PH	AMMONIA	LC50 (1)
AUGUST 10,1982:																			
FINAL EFFLUENT	285	150	--	3400	280	1730	30	1700	970	1913	2430	4.2	0.43	2.50	548	430	3.5	1.60	25
JULY 10,1983:																			
FINAL EFFLUENT	260	--	85.0	2000	240	1550	30	1520	898	--	1820	--	0.08	2.10	461	340	4.5	0.90	18
MILL INTAKE WATER	2	--	4.0	0.4	0.3	65	1	64	8	--	99	--	0.01	.13	1.6	1.6	7.7	<.01	--
JULY 11,1983:																			
FINAL EFFLUENT	338	--	102.0	2460	540	1750	30	1720	1545	--	2470	--	0.38	2.80	631	370	3.0	2.1	8(2) 14(3)
MILL INTAKE WATER	10	--	4.0	0.4	0.8	70	1	69	5	--	99	--	0.01	.18	1.6	1.6	7.7	<.01	--
JULY 12,1983:																			
FINAL EFFLUENT	177	--	141.0	260	140	1520	25	1495	694	--	1840	--	0.51	1.00	440	350	4.5	0.2	26
MILL INTAKE WATER	2	--	4.5	<0.2	0.8	55	1	54	7	--	99	--	0.01	.16	1.5	1.4	7.7	<.01	--
JULY 13,1983:																			
FINAL EFFLUENT	273	--	99.0	2180	235	1650	30	1620	985	--	1960	--	0.53	2.50	346	360	4.1	1.6	19
MILL INTAKE WATER	2	--	6.0	0.2	0.6	75	1	74	18	--	99	--	0.01	.22	1.6	1.8	7.7	<.01	--
JULY 14,1983:																			
FINAL EFFLUENT	--	--	114.0	--	245	1460	30	1430	976	--	1630	--	0.41	3.00	381	320	5.5	1.0	42
MILL INTAKE WATER	2	--	4.5	<0.2	0.5	90	1	89	2	--	101	--	0.01	.16	2.0	2.2	7.8	<.01	--
ALL CONCENTRATIONS	MG/L	MG/L	MG/L	UG/L	MG/L	MG/L	MG/L	MG/L	MG/L	HZ	US/CM	FTU	MG/L	MG/L	MG/L	MG/L	SU	MG/L	%

-- -NOT AVAILABLE
HZ -HAZEN UNITS
US/CM -MICROSIEMENS/CM
FTU -FORMAZIN TURBIDITY UNITS
SU -STANDARD UNITS
DOC -DISSOLVED ORGANIC CARBON
BOD -BIOLOGICAL OXYGEN DEMAND
COD -CHEMICAL OXYGEN DEMAND
TP -TOTAL PHOSPHORUS
TKN -TOTAL KJELDAHL NITROGEN
(1) -FISH BIOASSAY-% CONCENTRATION LETHAL TO 50% OF FISH IN 96 HOURS.
(2) -GRAB SAMPLE
(3) -24-HOUR COMPOSITE SAMPLE
< -LESS THAN

TABLE:10 BACTERIAL COUNTS IN ABITIBI PRICE FINE PAPERS, PORT ARTHUR DIVISION, EFFLUENTS.

DATE SAMPLED/ SAMPLE DESCRIPTION	BACTERIA (COUNTS PER 100 ML)						
	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCI	HETEROTROPHS (1)	PSEUDOMONAS AERUGINOSA	ESCHERICHIA COLI	SULPHATE REDUCERS
JULY 7,1982:							
GROUNDWOOD EFFLUENT	<100	<100	6800	240000	<100	<100	300
PAPER MILL EFFLUENT	5800	<100	<100	9900	<100	<100	--
AUGUST 4,1982:							
FINAL EFFLUENT	A 20000	<100	<100	1400000	<10	<100	92

-- -NOT AVAILABLE
(1) -COUNTS PER 1 ML
A -APPROXIMATELY
< -LESS THAN

TABLE:11 BACTERIAL COUNTS IN ABITIBI PRICE INC., FORT WILLIAM DIVISION, EFFLUENTS.

DATE SAMPLED/ SAMPLE DESCRIPTION	BACTERIA (COUNTS PER 100 ML)						
	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCI	(1) HETEROTROPHS	PSEUDOMONAS AERUGINOSA	ESCHERICHIA COLI	SULPHATE REDUCERS
JULY 21,1982:							
COMBINED FINAL EFFLUENT*	3500000	A 50000	2800	4200000	--	A 20000	<3000
FINAL EFFLUENT**	820000	26000	1800	6000000	--	A 50000	<3000
WOODROOM EFFLUENT	15000000	A 40000	6700	5500000	--	A 40000	>1100000
SCMP EFFLUENT	43000	A 4000	3000	29000	--	A 2000	240000

-- -NOT AVAILABLE
(1) -COUNTS PER 1 ML
* -NO.1 & NO.2 LAGOON EFFLUENTS AND WOODROOM EFFLUENT
** -NO.1 & NO.2 LAGOON EFFLUENTS
SCMP-SEMI CHEMICAL MECHANICAL PULPING
A -APPROXIMATELY
< -LESS THAN
> -GREATER THAN

TABLE:12 BACTERIAL COUNTS IN ABITIBI PRICE INC.,
THUNDER BAY DIVISION, EFFLUENTS AND MILL INTAKE WATER.

DATE SAMPLED/ SAMPLE DESCRIPTION	BACTERIA (COUNTS PER 100 ML)						
	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCI	(1) HETEROTROPHS	PSEUDOMONAS SAERUGINOSA	ESCHERICHIA COLI	SULPHATE REDUCERS
JUNE 3,1982:							
FINAL EFFLUENT	--	--	--	--	--	--	24000
JUNE 16,1982:							
FINAL EFFLUENT	5100	<10	160	6700000	A 30	<10	43000
JULY 21,1982:							
FINAL EFFLUENT	A620000	A 200	1400	--	--	<100	240000
MILL INTAKE WATER	370	84	172	--	--	--	<300
JULY 22,1982:							
FINAL EFFLUENT	460000	A 300	3800	--	--	--	240000
MILL INTAKE WATER	A 700	<4	4	--	--	--	150
JULY 23,1982:							
FINAL EFFLUENT	260000	A 50	4700	--	A 200	--	150000
MILL INTAKE WATER	A 200	<4	12	--	<2	--	23

-- -NOT AVAILABLE
(1) -COUNTS PER 1 ML
A -APPROXIMATELY
< -LESS THAN

TABLE:13 BACTERIAL COUNTS IN BOISE CASCADE CANADA LIMITED, FORT FRANCES, EFFLUENTS.

DATE SAMPLED/ SAMPLE DESCRIPTION	BACTERIA (COUNTS PER 100 ML)						
	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCI	HETEROTROPHS (1)	PSEUDOMONAS AERUGINOSA	ESCHERICHIA COLI	SULPHATE REDUCERS
JULY 13,1982:							
FINAL EFFLUENT	2500000	3300000	810000	60000000	A 100	<100000	>11000
SECONDARY LAGOON INFLUENT	25000	27000	8900	37000	A 100	<1000	240
SECONDARY LAGOON EFFLUENT	5200000	4600000	720000	110000000	<100	<100000	>11000

-- -NOT AVAILABLE
(1) -COUNTS PER 1 ML
A -APPROXIMATELY
< -LESS THAN
> -GREATER THAN

TABLE:14 BACTERIAL COUNTS IN DOMTAR PACKAGING/KRAFT PAPER AND BOARD DIVISION, RED ROCK MILL, EFFLUENTS AND MILL INTAKE WATER.

DATE SAMPLED/ SAMPLE DESCRIPTION	BACTERIA (COUNTS PER 100 ML)						
	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCI	HETEROTROPHS (1)	PSEUDOMONAS AERUGINOSA	ESCHERICHIA COLI	SULPHATE REDUCERS
JUNE 14,1982:							
FINAL EFFLUENT*	12000000	A 100	A 900	15000000	A 40	A 100	2400000
JULY 5,1982:							
WOODROOM EFFLUENT:							
ALUM UNTREATED	240000	A 8000	<1000	32000000	A 6000	<1000	1500000
ALUM TREATED	A 6000	<1000	<1000	2000000	<1000	<1000	43000
JULY 17,1983:							
FINAL EFFLUENT *	A 100000	<10000	<1000	22000000	<100	<1000	460000
MILL INTAKE WATER	A 520	8	<4	2350	<2	--	430
JULY 18,1983:							
FINAL EFFLUENT *	A 300000	A 2000	A 700	13500000	<100	A 200	>1100000
MILL INTAKE WATER	A 480	<4	<4	3800	<2	--	43
JULY 19,1983:							
FINAL EFFLUENT *	A 90000	A 1300	<100	8500000	<100	A 400	1100000
MILL INTAKE WATER	100	<4	<4	A 1500	<2	--	92
JULY 20,1983:							
FINAL EFFLUENT *	A 370000	A 4000	A 100	3300000	A 100	A 100	93000
MILL INTAKE WATER	220	<4	4	A 2500	<2	8	93
JULY 21,1983:							
FINAL EFFLUENT *	A 400000	A 2000	<100	26500000	<100	<1000	1100000
MILL INTAKE WATER	570	16	4	3000	2	--	39

-- -NOT AVAILABLE
(1) -COUNTS PER 1 ML
A -APPROXIMATELY
< -LESS THAN
> -GREATER THAN

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

TABLE:15 BACTERIAL COUNTS IN GREAT LAKES FOREST PRODUCTS LIMITED, DRYDEN, EFFLUENT.

DATE SAMPLED/ SAMPLE DESCRIPTION	BACTERIA (COUNTS PER 100 ML)						
	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCI	(1) HETEROTROPHS	PSEUDOMONAS SAERUGINOSA	ESCHERICHIA COLI	SULPHATE REDUCERS
AUGUST 23,1982: FINAL EFFLUENT	69000000	<10000	2500	--	<100	<10000	93000

-- -NOT AVAILABLE
(-COUNTS PER 1 ML
< -LESS THAN

TABLE:16 BACTERIAL COUNTS IN GREAT LAKES FOREST PRODUCTS LIMITED, THUNDER BAY, EFFLUENT.

DATE SAMPLED/ SAMPLE DESCRIPTION	BACTERIA (COUNTS PER 100 ML)						
	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCI	HETEROTROPHS (1)	PSEUDOMONAS AERUGINOSA	ESCHERICHIA COLI	SULPHATE REDUCERS
JUNE 8,1982: FINAL EFFLUENT	44000000	3600000	A 200	6600000	<100	--	23000

-- -NOT AV (BLE
(1) -COUNTS PER 1 ML
A -APPROXIMATELY
< -LESS THAN

TABLE:17 BACTERIAL COUNTS IN JAMES RIVER MARATHON LTD.,
(FORMERLY: AMERICAN CAN CANADA LTD.), MARATHON, EFFLUENTS.

	BACTERIA (COUNTS PER 100 ML)						
DATE SAMPLED/ SAMPLE DESCRIPTION	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCI	HETEROTROPHS (1)	PSEUDOMONAS AERUGINOSA	ESCHERICCHIA COLI	SULPHATE REDUCERS
JUNE 22,1982:							
FINAL EFFLUENT	<100	<10	A 50	1100	<10	<10	<300
MAIN MILL EFFLUENT	<10	<10	140	485	<10	<10	<300
ACIDIC SEWER EFFLUENT	<10	<10	<10	<10	<10	<10	<300
ALKALINE SEWER EFFLUENT	<100	<10	<10	<10	<10	<10	<300
AUGUST 16,1982:							
FINAL EFFLUENT	<10	<10	<10	<10	<10	<10	4

-- -NOT AVAILABLE
(1) -COUNTS PER 1 ML
A -APPROXIMATELY
< -LESS THAN

TABLE:18 BACTERIAL COUNTS IN KIMBERLY-CLARK OF CANADA LIMITED, TERRACE BAY, EFFLUENT.

DATE SAMPLED/ SAMPLE DESCRIPTION	BACTERIA (COUNTS PER 100 ML)						
	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCI	HETEROTROPHS (1)	PSEUDOMONAS AERUGINOSA	ESCHERICHIA COLI	SULPHATE REDUCERS
AUGUST 10,1982: FINAL EFFLUENT	<100	<100	<100	<100	<100	<100	390

-- -NOT AVAILABLE (1) -COUNTS PER 1 ML
< -LESS THAN

TABLE:19 INORGANIC TRACE CONTAMINANTS IN ABITIBI PRICE FINE PAPERS, PORT ARTHUR DIVISION, EFFLUENTS.

CONCENTRATIONS OF INORGANIC TRACE CONTAMINANTS (MG/L = PPM)

DATE SAMPLED/ SAMPLE DESCRIPTION	(1) MERCURY	ALUMINUM	ARSENIC	CADMIUM	COBALT	CHROMIUM	COPPER	IRON	MANGANESE	MOLYBDENUM	NICKEL	LEAD	ZINC	HYDROGEN SULPHIDE	CYANIDE
JULY 7,1982:															
GROUNDWOOD EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.02	<0.005
PAPER MILL EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.02	<0.005
AUGUST 4,1982:															
FINAL EFFLUENT	<0.05	0.57	<0.001	<0.005	<0.02	0.02	0.018	0.33	0.089	<0.05	<0.02	<0.03	0.18	<0.02	<0.005

-- -NOT AVAILABLE
(1) -CONCENTRATIONS IN UG/L = PPB
< -LESS THAN

TABLE:20 INORGANIC TRACE CONTAMINANTS IN ABITIBI PRICE INC., FORT WILLIAM DIVISION, EFFLUENTS.

CONCENTRATIONS OF INORGANIC TRACE CONTAMINANTS (MG/L = PPM)

DATE SAMPLED/ SAMPLE DESCRIPTION	(1) MERCURY	ALUMINUM	ARSENIC	CADMIUM	COBALT	CHROMIUM	COPPER	IRON	MANGANESE	MOLYBDENUM	NICKEL	LEAD	ZINC	HYDROGEN SULPHIDE	CYANIDE
JULY 21,1982:															
COMBINED FINAL EFFLUENT*	<0.05	2.0	0.001	0.005	<0.02	0.04	0.03	4.3	0.67	<0.02	<0.02	<0.03	0.08	2.00	<0.005
FINAL EFFLUENT*	<0.05	2.0	<0.001	0.005	<0.02	0.03	0.02	1.8	0.41	<0.02	<0.02	<0.03	0.06	0.19	<0.005
WOODROOM EFFLUENT	<0.05	2.2	0.002	0.007	<0.02	0.08	0.03	7.7	1.20	0.02	<0.02	<0.03	0.11	7.50	<0.005
SCMP EFFLUENT	0.16	3.6	<0.001	<0.005	<0.02	0.06	0.09	1.7	0.56	0.02	<0.02	0.03	2.10	<0.02	<0.005

(1) -CONCENTRATIONS IN UG/L = PPB
* -NO.1 & NO.2 LAGOON EFFLUENTS AND WOODROOM EFFLUENT
** -NO.1 & NO.2 LAGOON EFFLUENTS
SCMP-SEMI CHEMICAL MECHANICAL PULPING
< -LESS THAN

TABLE:21 INORGANIC TRACE CONTAMINANTS IN ABITIBI PRICE INC., THUNDER BAY DIVISION, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS OF INORGANIC TRACE CONTAMINANTS (MG/L = PPM)

DATE SAMPLED/ SAMPLE DESCRIPTION	(1) MERCURY	ALUMINUM	ARSENIC	CADMIUM	COBALT	CHROMIUM	COPPER	IRON	MANGANESE	MOLYBDENUM	NICKEL	LEAD	ZINC	HYDROGEN SULPHIDE	CYANIDE
JUNE 3,1982:															
FINAL EFFLUENT	0.07	1.10	0.001	<0.0050	<0.020	0.080	<0.010	0.95	0.500	--	<0.020	<0.030	0.080	<0.02	<0.005
JUNE 16,1982:															
FINAL EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	0.12	--
JULY 21,1982:															
FINAL EFFLUENT	0.88	0.65	0.005	<0.0002	0.002	0.004	0.011	--	--	--	0.004	0.007	0.046	0.02	<0.005
MILL INTAKE WATER	<0.05	0.12	<0.001	<0.0002	<0.001	<0.001	0.005	--	--	--	<0.001	<0.003	0.006	<0.01	<0.005
JULY 22,1982:															
FINAL EFFLUENT	<0.05	0.65	0.006	0.0004	0.003	0.002	0.013	--	--	--	0.005	0.006	0.050	0.03	<0.005
MILL INTAKE WATER	<0.05	0.06	<0.001	<0.0002	<0.001	<0.001	0.003	--	--	--	<0.001	<0.003	0.008	<0.01	<0.005
JULY 23,1982:															
FINAL EFFLUENT	<0.05	--	0.002	--	--	--	--	--	--	--	--	--	--	0.03	<0.005
MILL INTAKE WATER	<0.05	0.04	<0.001	<0.0002	<0.001	<0.001	0.004	--	--	--	<0.001	<0.003	0.007	<0.01	<0.005

-- -NOT AVAILABLE
(1) -CONCENTRATIONS IN UG/L = PPB
< -LESS THAN

TABLE:22 INORGANIC TRACE CONTAMINANTS IN BOISE CASCADE CANADA LIMITED, FORT FRANCES, EFFLUENTS.

CONCENTRATIONS OF INORGANIC TRACE CONTAMINANTS (MG/L = PPM)

DATE SAMPLED/ SAMPLE DESCRIPTION	(1) MERCURY	ALUMINUM	ARSENIC	CADMIUM	COBALT	CHROMIUM	COPPER	IRON	MANGANESE	MOLYBDENUM	NICKEL	LEAD	ZINC	HYDROGEN SULPHIDE	CYANIDE
JULY 13,1982:															
FINAL EFFLUENT	<0.05	0.55	<0.001	<0.005	<0.02	0.05	0.01	2.0	0.51	<0.02	<0.02	<0.03	0.09	0.81	<0.005
SECONDARY LAGOON INFLUENT	<0.05	0.40	<0.001	<0.005	<0.02	0.06	0.01	2.5	0.56	<0.02	<0.02	<0.03	0.12	9.00	<0.005
SECONDARY LAGOON EFFLUENT	<0.05	0.70	<0.001	<0.005	<0.02	0.07	0.10	2.5	0.71	<0.02	<0.02	<0.03	0.11	--	<0.005

-- -NOT AVAILABLE
(1) -CONCENTRATIONS IN UG/L = PPB
< -LESS THAN

TABLE:23 INORGANIC TRACE CONTAMINANTS IN DOMTAR PACKAGING/KRAFT PAPER AND BOARD DIVISION RED ROCK MILL, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS OF INORGANIC TRACE CONTAMINANTS (MG/L = PPM)

DATE SAMPLED/ SAMPLE DESCRIPTION	(1) MERCURY	ALUMINUM	ARSENIC	CADMIUM	COBALT	CHROMIUM	COPPER	IRON	MANGANESE	MOLYBDENUM	NICKEL	LEAD	ZINC	HYDROGEN SULPHIDE	CYANIDE
JUNE 14,1982:															
FINAL EFFLUENT *	0.39	4.0	<0.001	<0.0050	<0.02	0.030	<0.020	0.63	0.27	--	<0.020	0.060	.050	<0.02	<0.005
JULY 5,1982:															
WOODROOM EFFLUENT															
ALUM UNTREATED	0.35	170.0	0.005	<0.0050	<0.02	0.230	0.050	34.00	1.60	0.03	<0.020	0.030	.320	0.61	<0.005
ALUM TREATED	0.16	4.9	0.006	<0.0050	<0.02	0.230	0.040	19.00	1.80	0.03	<0.020	0.070	.310	0.55	<0.005
JULY 17,1983:															
FINAL EFFLUENT *	<0.05	4.4	0.001	0.0003	.001	0.100	0.015	0.53	--	--	0.003	<0.003	.033	.012	<0.001
MILL INTAKE WATER	<0.05	0.1	0.001	<0.0002	<.001	0.006	0.004	0.29	--	--	<0.001	<0.003	.009	<.001	<0.001
JULY 18,1983:															
FINAL EFFLUENT *	<0.05	3.8	<.001	0.0003	.001	0.006	0.011	0.46	--	--	0.003	<0.003	.028	.019	<0.001
MILL INTAKE WATER	<0.05	0.2	<.001	<0.0002	<.001	<0.001	0.007	0.16	--	--	0.001	<0.003	.012	<.001	<0.001
JULY 19,1983:															
FINAL EFFLUENT *	<0.05	3.4	.001	<0.0002	.001	0.006	0.015	0.42	--	--	0.001	<0.003	.025	.007	<0.001
MILL INTAKE WATER	<0.05	0.1	<.001	<0.0002	<.001	0.001	0.004	0.16	--	--	<0.001	<0.003	.009	<.001	<0.001
JULY 20,1983:															
FINAL EFFLUENT *	<0.05	3.8	<.001	0.0004	.001	0.006	0.015	0.56	--	--	0.003	<0.003	.027	.082	<0.001
MILL INTAKE WATER	<0.05	0.1	<.001	<0.0002	<.001	<0.001	0.006	0.14	--	--	0.001	<0.003	.011	<.001	<0.001
JULY 21,1983:															
FINAL EFFLUENT *	<0.05	3.8	--	0.0004	.001	0.006	0.016	0.47	--	--	0.003	<0.003	.037	.091	<0.001
MILL INTAKE WATER	<0.05	0.1	--	<0.0002	<.001	<0.001	0.002	0.16	--	--	<0.001	<0.003	.008	<.001	<0.001

ND -NOT DETECTED
-- -NOT AVAILABLE
(1) -CONCENTRATIONS IN UG/L = PPB
< -LESS THAN

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

TABLE:24 INORGANIC TRACE CONTAMINANTS IN GREAT LAKES FOREST PRODUCTS LIMITED, DRYDEN, EFFLUENT.

	CONCENTRATIONS OF INORGANIC TRACE CONTAMINANTS (MG/L = PPM)														
DATE SAMPLED/ SAMPLE DESCRIPTION	(1) MERCURY	ALUMINUM	ARSENIC	CADMIUM	COBALT	CHROMIUM	COPPER	IRON	MANGANESE	MOLYBDENUM	NICKEL	LEAD	ZINC	HYDROGEN SULPHIDE	CYANIDE
AUGUST 23,1982:															
FINAL EFFLUENT	<0.05	1.4	<0.001	<0.005	<0.02	0.21	0.01	2.4	0.30	<0.05	0.05	<0.03	0.06	0.10	<0.005

(1) -CONCENTRATIONS IN UG/L = PPB
< -LESS THAN

TABLE:25 INORGANIC TRACE CONTAMINANTS IN GREAT LAKES FOREST PRODUCTS LIMITED, THUNDER BAY, EFFLUENT.

DATE SAMPLED/ SAMPLE DESCRIPTION	(1) MERCURY	ALUMINUM	ARSENIC	CADMIUM	COBALT	CHROMIUM	COPPER	IRON	MANGANESE	MOLYBDENUM	NICKEL	LEAD	ZINC	HYDROGEN SULPHIDE	CYANIDE
	CONCENTRATIONS OF INORGANIC TRACE CONTAMINANTS (MG/L = PPM)														
JUNE 8,1982:															
FINAL EFFLUENT	0.27	13.0	<0.001	<0.005	<0.02	0.10	0.03	2.5	0.09	--	<0.02	<0.03	0.13	--	<0.005

-- -NOT AVAILABLE
(1) -CONCENTRATIONS IN UG/L = PPB
< -LESS THAN

TABLE:26 INORGANIC TRACE CONTAMINANTS IN JAMES RIVER MARATHON LTD., (FORMERLY: AMERICAN CAN CANADA INC.), EFFLUENTS.

DATE SAMPLED/ SAMPLE DESCRIPTION	CONCENTRATIONS OF INORGANIC TRACE CONTAMINANTS (MG/L = PPM)														
	(1) MERCURY	ALUMINUM	ARSENIC	CADMIUM	COBALT	CHROMIUM	COPPER	IRON	MANGANESE	MOLYBDENUM	NICKEL	LEAD	ZINC	HYDROGEN SULPHIDE	CYANIDE
JUNE 22,1982:															
FINAL EFFLUENT	0.15	0.45	<0.001	<0.005	<0.02	0.13	0.02	2.7	0.62	0.03	0.02	<0.03	0.16	0.46	0.045
MAIN MILL EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	211.00	0.008
ACIDIC SEWER EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	0.44	--
ALKALINE SEWER EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	10.00	0.040
AUGUST 16,1982:															
FINAL EFFLUENT	0.20	0.23	<0.001	<0.005	<0.02	0.07	0.01	1.4	0.35	--	<0.02	<0.03	0.07	0.06	<0.005

-- -NOT AVAILABLE
(1) -CONCENTRATIONS IN UG/L = PPB
< -LESS THAN

TABLE:27 INORGANIC TRACE CONTAMINANTS IN KIMBERLY-CLARK OF CANADA LIMITED, TERRACE BAY, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS OF INORGANIC TRACE CONTAMINANTS (MG/L = PPM)

DATE SAMPLED/ SAMPLE DESCRIPTION	(1) MERCURY	ALUMINUM	ARSENIC	CADMIUM	COBALT	CHROMIUM	COPPER	IRON	MANGANESE	MOLYBDENUM	NICKEL	LEAD	ZINC	HYDROGEN SULPHIDE	CYANIDE
AUGUST 10,1982:															
FINAL EFFLUENT	<0.05	0.39	<0.001	<0.0050	<0.02	0.060	0.010	2.10	0.47	<0.05	0.03	<0.030	0.070	0.03	<0.005
JULY 10,1983:															
FINAL EFFLUENT	<0.05	0.43	--	<0.0050	--	<0.020	0.020	0.64	--	--	--	<0.030	<0.010	0.013	--
MILL INTAKE WATER	<0.05	<0.01	--	0.0010	--	0.002	0.003	0.04	--	--	--	0.003	0.005	<0.001	--
JULY 11,1983:															
FINAL EFFLUENT	0.19	0.62	--	0.0050	--	<0.020	<0.010	0.82	--	--	--	<0.030	0.055	0.017	--
MILL INTAKE WATER	0.07	0.03	--	0.0005	--	0.002	0.003	0.04	--	--	--	<0.003	0.004	<0.001	--
JULY 12,1983:															
FINAL EFFLUENT	<0.05	0.76	--	<0.0050	--	<0.020	<0.010	0.94	--	--	--	<0.030	0.075	0.002	--
MILL INTAKE WATER	<0.05	0.02	--	0.0005	--	<0.002	0.004	0.05	--	--	--	<0.003	0.003	<0.001	--
JULY 13,1983:															
FINAL EFFLUENT	0.12	0.66	--	0.0050	--	<0.020	<0.010	0.64	--	--	--	<0.030	0.075	0.004	--
MILL INTAKE WATER	0.06	0.02	--	0.0015	--	<0.002	0.011	0.04	--	--	--	0.006	0.004	<0.001	--
JULY 14,1983:															
FINAL EFFLUENT	0.05	0.66	--	0.0050	--	0.030	<0.010	0.62	--	--	--	<0.030	0.065	0.009	--
MILL INTAKE WATER	<0.05	0.02	--	<0.0015	--	0.003	0.004	0.05	--	--	--	<0.003	0.004	<0.001	--

ND -NOT DETECTED
-- -NOT AVAILABLE
(1) -CONCENTRATIONS IN UG/L = PPB
< -LESS THAN

TABLE:28 FATTY, AROMATIC AND RESIN ACIDS IN ABITIBI PRICE FINE PAPERS, PORT ARTHUR DIVISION, EFFLUENTS.

	CONCENTRATIONS (UG/L = PPB) OF FATTY, AROMATIC AND RESIN ACIDS																		
	FATTY ACIDS									AROMATIC ACIDS			RESIN ACIDS						
DATE SAMPLED/ SAMPLE DESCRIPTION	CAPRIC	LAURIC	MYRISTIC	PALMITIC	STEARIC	OLEIC	LINOLEIC	LINOLENIC	ARACHIDIC	BENZOIC	SALICYLIC	PHTHALIC	PIMARIC	SANDARACO-PIMARIC	LEVOPIMARIC	ISOPIMARIC	NEOABIETIC	ABIETIC	DEHYDRO-ABIETIC
JULY 7,1982:																			
GROUNDWOOD EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	698	ND	ND	1403	ND	606	86
PAPER MILL EFFLUENT	ND	ND	ND	291	421	70	239	ND	ND	ND	ND	ND	59	ND	149	ND	ND	736	ND
AUGUST 4,1982:																			
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	40	40

ND -NOT DETECTED

TABLE:29 FATTY, AROMATIC AND RESIN ACIDS IN ABITIBI PRICE INC., FORT WILLIAM DIVISION, EFFLUENTS.

CONCENTRATIONS (UG/L = PPB) OF FATTY, AROMATIC AND RESIN ACIDS

DATE SAMPLED/ SAMPLE DESCRIPTION	FATTY ACIDS									AROMATIC ACIDS			RESIN ACIDS						
	CAPRIC	LAURIC	MYRISTIC	PALMITIC	STEARIC	OLEIC	LINOLEIC	LINOLENIC	ARACHIDIC	BENZOIC	SALICYLIC	PHTHALIC	PIMARIC	SANDARACO-PIMARIC	LEVOPIMARIC	ISOPIMARIC	NEOABIETIC	ABIETIC	DEHYDRO-ABIETIC
JULY 21,1982:																			
COMBINED FINAL EFFLUENT*	ND	ND	ND	318	ND	1244	4801	1080	ND	ND	ND	ND	1795	3183	2612	5224	23239	15810	1187
FINAL EFFLUENT**	ND	ND	ND	ND	172	213	1176	220	ND	ND	ND	ND	110	585	411	600	2052	2372	545
WOODROOM EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110	195	114	ND	ND	290	ND
SCMP EFFLUENT	ND	ND	ND	214	129	1524	7058	1588	ND	ND	ND	ND	770	3640	2742	4640	23040	15301	1309
DETECTION LIMITS	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	40	40

ND -NOT DETECTED
* -NO.1 & NO.2 LAGOON EFFLUENTS AND WOODROOM EFFLUENT
** -NO.1 & NO.2 LAGOON EFFLUENTS
SCMP-SEMI CHEMICAL MECHANICAL PULPING

TABLE:30 FATTY, AROMATIC AND RESIN ACIDS IN ABITIBI PRICE INC., THUNDER BAY DIVISION, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (UG/L = PPB) OF FATTY, AROMATIC AND RESIN ACIDS

DATE SAMPLED/ SAMPLE DESCRIPTION	FATTY ACIDS									AROMATIC ACIDS			RESIN ACIDS						
	CAPRIC	LAURIC	MYRISTIC	PALMITIC	STEARIC	OLEIC	LINOLEIC	LINOLENIC	ARACHIDIC	BENZOIC	SALICYLIC	PHTHALIC	PIMARIC	SANDARACO-PIMARIC	LEVOPIMARIC	ISOPIMARIC	NEOABIETIC	ABIETIC	DEHYDRO-ABIETIC
JUNE 3,1982: FINAL EFFLUENT	ND	ND	ND	84	ND	229	646	ND	ND	ND	ND	ND	65	199	355	483	332	3606	488
JUNE 16,1982: FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	233	88
JULY 21,1982: FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 22,1982: FINAL EFFLUENT	ND	ND	ND	134	ND	297	1310	236	ND	ND	ND	ND	758	747	998	1701	8066	5509	459
JULY 23,1982: FINAL EFFLUENT	ND	ND	ND	108	ND	254	1102	212	ND	ND	ND	ND	611	1227	ND	1377	7062	4357	323
DETECTION LIMIT	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	40	40

ND -NOT DETECTED

TABLE:31 FATTY, AROMATIC AND RESIN ACIDS IN BOISE CASCADE CANADA LIMITED FORT FRANCES, EFFLUENTS.

CONCENTRATIONS (UG/L = PPB) OF FATTY, AROMATIC AND RESIN ACIDS

DATE SAMPLED/ SAMPLE DESCRIPTION	FATTY ACIDS									AROMATIC ACIDS			RESIN ACIDS						
	CAPRIC	LAURIC	MYRISTIC	PALMITIC	STEARIC	OLEIC	LINOLEIC	LINOLENIC	ARACHIDIC	BENZOIC	SALICYLIC	PHTHALIC	PIMARIC	SANDARACO-PIMARIC	LEVOPIMARIC	ISOPIMARIC	NEOABIETIC	ABIETIC	DEHYDRO-ABIETIC
JULY 13,1982:																			
FINAL EFFLUENT	ND	ND	ND	116	ND	273	3219	204	ND	ND	ND	ND	273	388	545	875	2766	2698	289
SECONDARY LAGOON INFLUENT	ND	ND	ND	61	77	226	898	ND	ND	ND	ND	ND	342	525	581	622	2054	2645	282
SECONDARY LAGOON EFFLUENT	ND	ND	101	56	ND	122	ND	ND	ND	ND	ND	ND	252	298	472	ND	ND	779	104
DETECTION LIMIT	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	40	40

ND -NOT DETECTED

TABLE:32 FATTY, AROMATIC AND RESIN ACIDS IN DOMTAR PACKAGING/KRAFT PAPER AND BOARD DIVISION RED ROCK MILL, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (UG/L = PPB) OF FATTY, AROMATIC AND RESIN ACIDS

DATE SAMPLED/ SAMPLE DESCRIPTION	FATTY ACIDS									AROMATIC ACIDS			RESIN ACIDS						
	CAPRIC	LAURIC	MYRISTIC	PALMITIC	STEARIC	OLEIC	LINOLEIC	LINOLENIC	ARACHIDIC	BENZOIC	SALICYLIC	PHTHALIC	PIMARIC	SANDARACO-C	PIMARIC	LEVOPIMARIC	ISOPIMARIC	NEOABIETIC	ABIETIC	DEHYDRO-	ABIETIC
JUNE 14,1982:																					
FINAL EFFLUENT*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	130	154	ND	136	ND	92	ND
JULY 5,1982:																					
WOODROOM EFFLUENT:																					
ALUM UNTREATED	ND	ND	ND	ND	ND	542	2356	140	ND	452	ND	ND	ND	1238	1166	2128	5470	7522	909
ALUM TREATED	ND	ND	ND	ND	ND	868	3472	187	ND	664	ND	ND	349	1650	1666	2619	9846	15044	1111
JULY 17,1983:																					
FINAL EFFLUENT*	2	8	5	48	14	64	137	2	4	85	22	ND	93	43	74	130	ND	392	273
MILL INTAKE WATER	2	ND	1	5	3	2	3	ND	ND	11	ND	ND	5	ND	ND	2	2	ND	2
JULY 18,1983:																					
FINAL EFFLUENT*	ND	ND	7	28	16	63	75	2	13	ND	39	ND	199	135	187	361	ND	1800	563
MILL INTAKE WATER	ND	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 19,1983:																					
FINAL EFFLUENT*	6	ND	6	17	11	37	ND	4	12	ND	48	ND	147	101	135	257	ND	1210	476
MILL INTAKE WATER	2	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	5	ND	ND	ND	ND	ND	ND
JULY 20,1983:																					
FINAL EFFLUENT*	7	2	9	106	25	ND	ND	34	16	3	50	16	156	106	61	282	ND	1020	681
MILL INTAKE WATER	ND	ND	1	12	13	ND	ND	ND	ND	ND	ND	ND	1	ND	ND	ND	ND	ND	1
JULY 21,1983:																					
FINAL EFFLUENT*	7	12	11	89	18	ND	6	17	ND	5	42	ND	161	91	ND	332	ND	189	657
MILL INTAKE WATER	ND	ND	ND	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2	ND
DETECTION LIMIT (1982)	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	40	40
DETECTION LIMIT (1983)	1	1	1	1	2	2	4	2	3	2	2	2	1	1	1	1	1	1	1

ND -NOT DETECTED

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

TABLE:33 FATTY, AROMATIC AND RESIN ACIDS IN GREAT LAKES FOREST PRODUCTS, LIMITED, DRYDEN, EFFLUENT.

CONCENTRATIONS (UG/L = PPB) OF FATTY, AROMATIC AND RESIN ACIDS

	FATTY ACIDS									AROMATIC ACIDS			RESIN ACIDS						
DATE SAMPLED/ SAMPLE DESCRIPTION	CAPRIC	LAURIC	MYRISTIC	PALMITIC	STEARIC	OLEIC	LINOLEIC	LINOLENIC	ARACHIDIC	BENZOIC	SALICYLIC	PHTHALIC	PIMARIC	SANDARACO-PIMARIC	LEVOPIMARIC	ISOPIMARIC	NEOABIETIC	ABIETIC	DEHYDRO-ABIETIC
AUGUST 23,1982: FINAL EFFLUENT	ND	ND	ND	ND	ND	33	ND	24	ND	ND	ND	ND	118	315	197	301	142	1354	137
DETECTION LIMIT	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	40	40

ND -NOT DETECTED

TABLE:34 FATTY, AROMATIC AND RESIN ACIDS IN GREAT LAKES FOREST PRODUCTS LIMITED, THUNDER BAY, EFFLUENT.

CONCENTRATIONS (UG/L = PPB) OF FATTY, AROMATIC AND RESIN ACIDS

	FATTY ACIDS									AROMATIC ACIDS			RESIN ACIDS						
DATE SAMPLED/ SAMPLE DESCRIPTION	CAPRIC	LAURIC	MYRISTIC	PALMITIC	STEARIC	OLEIC	LINOLEIC	LINOLENIC	ARACHIDIC	BENZOIC	SALICYLIC	PHTHALIC	PIMARIC	SANDARACO-PIMARIC	LEVOPIMARIC	ISOPIMARIC	NEOABIETIC	ABIETIC	DEHYDRO-ABIETIC
JUNE 8,1982: FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	103	83	ND	ND	232	ND
DETECTION LIMIT	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	40	40

ND -NOT DETECTED

TABLE:35 FATTY, AROMATIC AND RESIN ACIDS IN JAMES RIVER MARATHON LTD., (FORMERLY: AMERICAN CAN CANADA INC.), EFFLUENTS.

CONCENTRATIONS (UG/L = PPB) OF FATTY, AROMATIC AND RESIN ACIDS

	FATTY ACIDS									AROMATIC ACIDS			RESIN ACIDS						
DATE SAMPLED/ SAMPLE DESCRIPTION	CAPRIC	LAURIC	MYRISTIC	PALMITIC	STEARIC	OLEIC	LINOLEIC	LINOLENIC	ARACHIDIC	BENZOIC	SALICYLIC	PHTHALIC	PIMARIC	SANDARACO-C	LEVOPIMARIC	ISOPIMARIC	NEOABIETIC	ABIETIC	DEHYDRO-ABIETIC
JUNE 22,1982:																			
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	131	ND	ND	123	ND	48	ND
MAIN MILL EFFLUENT	ND	ND	ND	ND	ND	1406	3333	ND	ND	ND	ND	ND	419	ND	960	393	656	5740	485
ACIDIC SEWER EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ALKALINE SEWER EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	175	154	ND	ND	ND	241	ND
AUGUST 16,1982:																			
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200	ND	823	145
DETECTION LIMIT	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	40	40

ND -NOT DETECTED

TABLE:36 FATTY, AROMATIC AND RESIN ACIDS IN KIMBERLY-CLARK OF CANADA LTD., TERRACE BAY, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (UG/L = PPB) OF FATTY, AROMATIC AND RESIN ACIDS

DATE SAMPLED/ SAMPLE DESCRIPTION	FATTY ACIDS									AROMATIC ACIDS			RESIN ACIDS						
	CAPRIC	LAURIC	MYRISTIC	PALMITIC	STEARIC	OLEIC	LINOLEIC	LINOLENIC	ARACHIDIC	BENZOIC	SALICYLIC	PHTHALIC	PIMARIC	SANDARACO-PIMARIC	LEVOPIMARIC	ISOPIMARIC	NEOABIETIC	ABIETIC	DEHYDROABIETIC
AUGUST 10,1982:																			
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 10,1983:																			
FINAL EFFLUENT	6	2	3	80	10	66	222	2	ND	232	37	23	231	133	ND	274	ND	805	550
MILL INTAKE WATER	ND	ND	ND	4	ND	ND	4	ND	ND	3	ND	ND	5	ND	ND	1	ND	ND	2
JULY 11,1983:																			
FINAL EFFLUENT	--	51	22	64	6	51	168	ND	6	--	--	ND	197	275	125	365	ND	1300	523
MILL INTAKE WATER	ND	ND	ND	1	ND	ND	ND	ND	ND	6	ND	ND	5	5	ND	ND	2	ND	1
JULY 12,1983:																			
FINAL EFFLUENT	5	4	10	89	24	53	398	5	8	301	8	23	120	61	305	102	ND	404	236
MILL INTAKE WATER	ND	ND	ND	3	2	ND	6	ND	ND	16	ND	ND	6	ND	ND	1	1	ND	1
JULY 13,1983:																			
FINAL EFFLUENT	7	9	20	122	28	52	485	7	17	234	25	23	170	133	560	194	ND	756	333
MILL INTAKE WATER	ND	ND	ND	3	ND	ND	ND	ND	ND	17	ND	ND	5	ND	ND	ND	ND	ND	4
JULY 14,1983:																			
FINAL EFFLUENT	5	22	4	18	10	8	60	ND	ND	266	28	ND	292	106	227	384	ND	278	760
MILL INTAKE WATER	ND	ND	1	4	ND	ND	ND	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT(1982)	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	40	40
DETECTION LIMIT(1983)	1	1	1	1	2	2	4	2	3	2	2	2	1	1	1	1	1	1	1

ND -NOT DETECTED

TABLE:37 SPECIFIC PHENOLIC COMPOUNDS IN ABITIBI PRICE FINE PAPERS, PORT ARTHUR DIVISION, EFFLUENTS.

CONCENTRATIONS (UG/L = PPB) OF SPECIFIC PHENOLIC COMPOUNDS

DATE SAMPLED/ SAMPLE DESCRIPTION	PHENOL	VANILLIN	HOMOVANILLIC ACID	GUAIACOL	SYRINGALDEHYDE	ACETOVANILLON	VANILLIC ACID	ACETOSYRINGONE	2,5-XYLENOL	P-CRESOL	MCHLOROCRESOL	P-CRESOL	2 CP	4 CP	2,4-DCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,4,6-TTCP	PCP
JULY 7,1982:																				
GROUNDWOOD EFFLUENT	40	5	21	12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAPER MILL EFFLUENT	17	5	ND	17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AUGUST 4,1982:																				
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

ND -NOT DETECTED
CP -CHLOROPHENOL
DCP -DICHLOROPHENOL
TCP -TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP -PENTACHLOROPHENOL

TABLE:38 SPECIFIC PHENOLIC COMPOUNDS IN ABITIBI PRICE INC., FORT WILLIAM DIVISION, EFFLUENTS.

DATE SAMPLED/ SAMPLE DESCRIPTION	CONCENTRATIONS (UG/L = PPB) OF SPECIFIC PHENOLIC COMPOUNDS																		
	PHENOL	VANILLIN	HOMOVANILLIC ACID	GUAIACOL	SYRINGALDEHYDE	ACETOVANILLON	VANILLIC ACID	ACETOSYRINGONE	2,5-XYLENOL	P-CRESOL	M-CHLORO-P-CRESOL	2-CP	4-CP	2,4-DCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,4,5,6-TTCP	PCP
JULY 21,1982:																			
COMBINED FINAL EFFLUENT*	ND	302	ND	ND	ND	94	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FINAL EFFLUENT**	ND	288	ND	ND	ND	58	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WOODROOM EFFLUENT	ND	162	540	576	ND	171	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SCMP EFFLUENT	ND	178	ND	ND	ND	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

ND -NOT DETECTED
* -NO.1 & NO.2 LAGOON EFFLUENTS AND WOODROOM EFFLUENT
** -NO.1 & NO.2 LAGOON EFFLUENTS
SCMP-SEMI CHEMICAL MECHANICAL PULPING
CP -CHLOROPHENOL
DCP -DICHLOROPHENOL
TCP -TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP -PENTACHLOROPHENOL

TABLE:39 SPECIFIC PHENOLIC COMPOUNDS IN ABITIBI PRICE INC., THUNDER BAY DIVISION, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (UG/L = PPB) OF SPECIFIC PHENOLIC COMPOUNDS

DATE SAMPLED/ SAMPLE DESCRIPTION	PHENOL	VANILLIN	HOMOVANILLIC ACID	GUAIACOL	SYRINGALDEHYDE	ACETOVANILLON	VANILLIC ACID	ACETOSYRINGONE	2,5-XYLENOL	P-CRESOL	M-CHLOROCRESOL	2-CP	4-CP	2,4-DCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,4,6-TTCP	PCP
JUNE 3,1982:																			
FINAL EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
JUNE 16,1982:																			
FINAL EFFLUENT	ND	122	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 21,1982:																			
FINAL EFFLUENT	2600	140	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 22,1982:																			
FINAL EFFLUENT	2400	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 23,1982:																			
FINAL EFFLUENT	50	35	ND	140	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

ND -NOT DETECTED
-- -NOT AVAILABLE
CP -CHLOROPHENOL
DCP -DICHLOROPHENOL
TCP -TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP -PENTACHLOROPHENOL

TABLE:40 SPECIFIC PHENOLIC COMPOUNDS IN BOISE CASCADE CANADA LIMITED, FORT FRANCES, EFFLUENTS.

DATE SAMPLED/ SAMPLE DESCRIPTION	CONCENTRATIONS (UG/L = PPB) OF SPECIFIC PHENOLIC COMPOUNDS																		
	PHENOL	VANILLIN	HOMOVANILLIC ACID	GUAIACOL	SYRINGALDEHYDE	ACETOVANILLON	VANILLIC ACID	ACETOSYRINGONE	2,5-XYLENOL	P-CRESOL	M-CHLORO-P-CRESOL	2-CP	4-CP	2,4-DCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,4,5,6-TTCP	PCP
JULY 13,1982:																			
FINAL EFFLUENT	ND	ND	ND	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SECONDARY LAGOON INFLUENT	ND	880	ND	1310	ND	173	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SECONDARY LAGOON EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

ND -NOT DETECTED
CP -CHLOROPHENOL
DCP -DICHLOROPHENOL
TCP -TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP -PENTACHLOROPHENOL

TABLE:41 SPECIFIC PHENOLIC COMPOUNDS IN DOMTAR PACKAGING/KRAFT PAPER AND BOARD DIVISION RED ROCK MILL, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (UG/L = PPB) OF SPECIFIC PHENOLIC COMPOUNDS

DATE SAMPLED/ SAMPLE DESCRIPTION	PHENOL	VANILLIN	HOMOVANILLIC ACID	GUAIACOL	SYRINGALDEHYDE	ACETOVANILLON	VANILLACIDD	ACETOSYRINGONE	2,5-XYLENOL	P-CRESOL	M-CHLOROL	P-CRESOL	2-CP	4-CP	2,4-DCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,4,5-TTCP	PCP
JUNE 14,1982:																				
FINAL EFFLUENT *	ND	216	180	1250	ND	64	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 5,1982:																				
WOODROOM EFFLUENT																				
ALUM UNTREATED	13000	400	ND	2600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ALUM TREATED	17000	600	ND	2800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 17,1983:																				
FINAL EFFLUENT*	ND	13	ND	207	ND	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 18,1983:																				
FINAL EFFLUENT*	ND	44	ND	1100	ND	33	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 19,1983:																				
FINAL EFFLUENT*	ND	29	ND	945	ND	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 20,1983:																				
FINAL EFFLUENT*	ND	43	ND	540	ND	75	ND	19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 21,1983:																				
FINAL EFFLUENT*	ND	43	ND	1120	ND	52	ND	17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

ND -NOT DETECTED
-- -NOT AVAILABLE
CP -CHLOROPHENOL
DCP -DICHLOROPHENOL
TCP -TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP -PENTACHLOROPHENOL

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

TABLE:42 SPECIFIC PHENOLIC COMPOUNDS IN GREAT LAKES FOREST PRODUCTS LIMITED, DRYDEN, EFFLUENT.

	CONCENTRATIONS (UG/L = PPB) OF SPECIFIC PHENOLIC COMPOUNDS																			
DATE SAMPLED/ SAMPLE DESCRIPTION	PHENOL	VANILLIN	HOMOVANILLIC ACID	GUAIACOL	SYRINGALDEHYDE	ACETOVANILLON	VANILLIC ACID	ACETOSYRINGONE	2,5-XYLENOL	P-CRESOL	M-CHLORO-L	P-CRESOL	2-CP	4-CP	2,4-DCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,4,5,6-TTCP	PCP
AUGUST 23,1982: FINAL EFFLUENT	ND	72	ND	378	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

ND -NOT DETECTED
CP -CHLOROPHENOL
DCP -DICHLOROPHENOL
TCP -TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP -PENTACHLOROPHENOL

TABLE:43 SPECIFIC PHENOLIC COMPOUNDS IN GREAT LAKES FOREST PRODUCTS LIMITED, THUNDER BAY, EFFLUENT.

DATE SAMPLED/ SAMPLE DESCRIPTION	CONCENTRATIONS (UG/L = PPB) OF SPECIFIC PHENOLIC COMPOUNDS																				
	PHENOL	VANILLIN	HOMOVANILLIC ACID	GUAIACOL	SYRINGALDEHYDE	ACETOVANILLON	VANILLIC ACID	ACETOSYRINGONE	2,5-XYLENOL	P-CRESOL	M-CHLOROCRESOL	P-CRESOL	2-CP	4-CP	2,4-DCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,4,6-TTCP	PCP
JUNE 8,1982: FINAL EFFLUENT	ND	162	ND	1098	ND	288	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

ND -NOT DETECTED
CP -CHLOROPHENOL
DCP -DICHLOROPHENOL
TCP -TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP -PENTACHLOROPHENOL

TABLE:44 SPECIFIC PHENOLIC COMPOUNDS IN JAMES RIVER MARATHON LTD., (FORMERLY: AMERICAN CAN CANADA INC.), EFFLUENTS.

CONCENTRATIONS (UG/L = PPB) OF SPECIFIC PHENOLIC COMPOUNDS

DATE SAMPLED/ SAMPLE DESCRIPTION	PHENOL	VANILLIN	HOMOVANILLIC ACID	GUAIACOL	SYRINGALDEHYDE	ACETOVANILLON	VANILLIC ACID	ACETOSYRINGONE	2,5-XYLENOL	P-CRESOL	M-CHLORO-PCRESOL	2-CP	4-CP	2,4-DCP	2,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	PCP
JUNE 22,1982:																		
FINAL EFFLUENT	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MAIN MILL EFFLUENT	ND	1656	ND	9450	ND	900	720	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACIDIC SEWER EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ALKALINE SEWER EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
AUGUST 16,1982:																		
FINAL EFFLUENT	ND	144	ND	468	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

ND -NOT DETECTED
-- -NOT AVAILABLE
CP -CHLOROPHENOL
DCP -DICHLOROPHENOL
TCP -TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP -PENTACHLOROPHENOL

TABLE:45 SPECIFIC PHENOLIC COMPOUNDS IN KIMBERLY-CLARK OF CANADA LIMITED, TERRACE BAY, EFFLUENT.

CONCENTRATIONS (UG/L = PPB) OF SPECIFIC PHENOLIC COMPOUNDS

DATE SAMPLED/ SAMPLE DESCRIPTION	PHENOL	VANILLIN	HOMOVANILLIC ACID	GUAIACOL	SYRINGALDEHYDE	ACETOVANILLON	VANILLIC ACID	ACETOSYRINGONE	2,5-XYLENOL	P-CRESOL	M-CHLOROPHENOL	P-CRESOL	2-CP	4-CP	2,4-DCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,4,5,6-TTCP	PCP
AUGUST 10,1982: FINAL EFFLUENT	ND	216	270	612	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

ND -NOT DETECTED
CP -CHLOROPHENOL
DCP -DICHLOROPHENOL
TCP -TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP -PENTACHLOFOPHENOL

TABLE:46 CHLOROPHENOL CONCENTRATIONS IN ABITIBI PRICE FINE PAPERS, PORT ARTHUR DIVISION, EFFLUENTS AND MILL INTAKE WATER.

	CONCENTRATIONS (NG/L = PPT) OF CHLOROPHENOLS					
DATE SAMPLED/ SAMPLE DESCRIPTION	2,3,4-TCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,5,6-TTCP	PCP
JULY 7,1982:						
GROUNDWOOD EFFLUENT	ND	ND	ND	ND	ND	300
PAPER MILL EFFLUENT	ND	ND	ND	ND	ND	250
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
AUGUST 4,1982:						
FINAL EFFLUENT	--	--	--	--	--	--
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	100	50	50	50	50	50

ND -NOT DETECTED
-- -NOT AVAILABLE
TCP-TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP-PENTACHLOROPHENOL

TABLE:47 CHLOROPHENOL CONCENTRATIONS IN ABITIBI PRICE INC., FORT WILLIAM DIVISION, EFFLUENTS AND MILL INTAKE WATER.

	CONCENTRATIONS (NG/L = PPT) OF CHLOROPHENOLS					
DATE SAMPLED/ SAMPLE DESCRIPTION	2,3,4-TCP	2,3,4,5-TCP	2,3,4,6-TCP	2,3,5-TTCP	2,3,5,6-TTCP	PCP
JULY 21,1982:						
COMBINED FINAL EFFLUENT*	ND	ND	ND	ND	ND	100
FINAL EFFLUENT**	ND	ND	150	ND	ND	100
WOODROOM EFFLUENT	350	100	ND	ND	ND	200
SCMP EFFLUENT	ND	ND	ND	ND	ND	400
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	100	50	50	50	50	50

ND -NOT DETECTED
* -NO.1 & NO.2 LAGOON EFFLUENTS & WOODROOM EFFLUENT
** -NO.1 & NO.2 LAGOON EFFLUENTS
SCMP-SEMI CHEMICAL MECHANICAL PULPING
TCP-TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP-PENTACHLOROPHENOL

TABLE:48 CHLOROPHENOL CONCENTRATIONS IN ABITIBI PRICE INC., THUNDER BAY DIVISION, EFFLUENTS AND MILL INTAKE WATER.

	CONCENTRATIONS (NG/L = PPT) OF CHLOROPHENOLS					
DATE SAMPLED/ SAMPLE DESCRIPTION	2,3,4-TCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,5,6-TTCP	PCP
JUNE 3,1982:						
FINAL EFFLUENT	--	--	--	--	--	--
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JUNE 16,1982:						
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	250	ND	ND	ND
JULY 21,1982:						
FINAL EFFLUENT	ND	ND	ND	ND	200	ND
MILL INTAKE WATER	--	--	--	--	--	--
JULY 22,1982:						
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND
JULY 23,1982:						
FINAL EFFLUENT	ND	ND	ND	ND	ND	100
DETECTION LIMIT	100	50	50	50	50	50

ND -NOT DETECTED
-- -NOT AVAILABLE
TCP-TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP-PENTACHLOROPHENOL

TABLE:49 CHLOROPHENOL CONCENTRATIONS IN BOISE CASCADE CANADA LIMITED, FORT FRANCES, EFFLUENTS AND MILL INTAKE WATER.

	CONCENTRATIONS (NG/L = PPT) OF CHLOROPHENOLS					
DATE SAMPLED/ SAMPLE DESCRIPTION	2,3,4-TCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,5,6-TTCP	PCP
JULY 13,1982:						
FINAL EFFLUENT	4200	ND	2000	ND	1000	1000
SECONDARY LAGOON INFLUENT	2200	ND	2000	ND	1400	1000
SECONDARY LAGOON EFFLUENT	5100	ND	1000	ND	1500	1100
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	100	50	50	50	50	50

ND -NOT DETECTED
TCP-TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP-PENTACHLOROPHENOL

TABLE:50 CHLOROPHENOL CONCENTRATIONS IN DOMTAR PACKAGING/KRAFT PAPER, AND BOARD DIVISION RED ROCK MILL, EFFLUENTS AND MILL INTAKE WATER.

	CONCENTRATIONS (NG/L = PPT) OF CHLOROPHENOLS					
DATE SAMPLED/ SAMPLE DESCRIPTION	2,3,4-TCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,5,6-TTCP	PCP
JUNE 14,1982:						
FINAL EFFLUENT *	ND	ND	2100	ND	ND	100
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 5,1982:						
WOODROOM EFFLUENT:						
ALUM UNTREATED	ND	ND	ND	ND	ND	250
ALUM TREATED	ND	ND	ND	ND	ND	100
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 17,1983:						
FINAL EFFLUENT *	ND	ND	6600	ND	ND	760
MILL INTAKE WATER	ND	ND	5100	ND	ND	ND
JULY 18,1983:						
FINAL EFFLUENT *	ND	ND	1250	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 19,1983:						
FINAL EFFLUENT *	ND	ND	200	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 20,1983:						
FINAL EFFLUENT *	ND	ND	300	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 21,1983:						
FINAL EFFLUENT *	ND	ND	1300	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	100	50	50	50	50	50

ND -NOT DETECTED
TCP-TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP-PENTACHLOROPHENOL

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

TABLE:51 CHLOROPHENOL CONCENTRATIONS IN GREAT LAKES FOREST PRODUCTS LIMITED, DRYDEN, EFFLUENT AND MILL INTAKE WATER.

	CONCENTRATIONS (NG/L = PPT) OF CHLOROPHENOLS					
DATE SAMPLED/ SAMPLE DESCRIPTION	2,3,4-TCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,4,6-TTCP	PCP
AUGUST 23,1982:						
FINAL EFFLUENT	ND	ND	90	ND	250	100
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	100	50	50	50	50	50

ND -NOT DETECTED
TCP-TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP-PENTACHLOROPHENOL

TABLE:52 CHLOROPHENOL CONCENTRATIONS IN GREAT LAKES FOREST PRODUCTS LIMITED, THUNDER BAY, EFFLUENT AND MILL INTAKE WATER.

	CONCENTRATIONS (NG/L = PPT) OF CHLOROPHENOLS					
DATE SAMPLED/ SAMPLE DESCRIPTION	2,3,4-TCP	2,3,4,5-TCP	2,3,4,6-TCP	2,3,5,6-TTCP	2,3,5-TCP	PCP
JULY 8,1982:						
FINAL EFFLUENT	600	ND	450	ND	150	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	100	50	50	50	50	50

ND -NOT DETECTED
TCP-TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP-PENTACHLOROPHENOL

TABLE:53 CHLOROPHENOL CONCENTRATIONS IN JAMES RIVER MARATHON LTD., (FORMERLY: AMERICAN CAN CANADA INC.) MARATHON, EFFLUENTS AND MILL INTAKE WATER.

	CONCENTRATIONS (NG/L = PPT) OF CHLOROPHENOLS					
DATE SAMPLED/ SAMPLE DESCRIPTION	2,3,4-TCP	2,4,5-TCP	2,4,6-TCP	2,3,4,5-TTCP	2,3,5,6-TTCP	PCP
JUNE 22,1982:						
FINAL EFFLUENT	3800	ND	3200	ND	800	350
MAIN MILL EFFLUENT	ND	ND	ND	ND	ND	ND
ACIDIC SEWER EFFLUENT	12400	ND	15300	ND	4600	ND
ALKALINE SEWER EFFLUENT	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
AUGUST 16,1982:						
FINAL EFFLUENT	7450	ND	320	ND	420	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	100	50	50	50	50	50

ND -NOT DETECTED
TCP-TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP-PENTACHLOROPHENOL

TABLE:54 CHLOROPHENOL CONCENTRATIONS IN KIMBERLY-CLARK OF CANADA LIMITED, TERRACE BAY, EFFLUENTS AND MILL INTAKE WATER.

	CONCENTRATIONS (NG/L = PPT) OF CHLOROPHENOLS					
DATE SAMPLED/ SAMPLE DESCRIPTION	2,3,4-TCP	2,3,4-TCP	2,3,4-TCP	2,3,4,5-TTCP	2,3,4,6-TTCP	PCP
AUGUST 10,1982:						
FINAL EFFLUENT	3800	ND	2600	ND	1600	2200
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 10,1983:						
FINAL EFFLUENT	ND	50	11600	ND	ND	870
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 11,1983:						
FINAL EFFLUENT	ND	ND	16200	200	ND	2250
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 12,1983:						
FINAL EFFLUENT	ND	ND	7800	ND	ND	820
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 13,1983:						
FINAL EFFLUENT	--	--	--	--	--	--
MILL INTAKE WATER	--	--	--	--	--	--
JULY 14,1983:						
FINAL EFFLUENT	ND	ND	11000	ND	ND	1100
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	100	50	50	50	50	50

ND -NOT DETECTED
TCP-TRICHLOROPHENOL
TTCP-TETRACHLOROPHENOL
PCP-PENTACHLOROPHENOL

TABLE:55 ORGANOHALIDES IN ABITIBI PRICE FINE PAPERS,
PORT ARTHUR DIVISION, EFFLUENTS.

	CONCENTRATIONS (UG/L = PPB) OF ORGANOHALIDES					
DATE SAMPLED/ SAMPLE DESCRIPTION	CHLOROFORM	CARBON TETRACHLORIDE	TRICHLOROETHYLENE	DICHLOROMETHANE	CHLOROBROMO-METHANE	DIBROMOCHLORO-METHANE	TETRACHLOROETHYLENE
JULY 7,1982:							
GROUNDWOOD EFFLUENT	ND	ND	ND	ND	ND	ND	
PAPER MILL EFFLUENT	ND	ND	ND	ND	ND	ND	
AUGUST 4,1982:							
FINAL EFFLUENT	20	ND	ND	ND	ND	ND	
DETECTION LIMIT	1.0	0.1	2.0	0.5	1.0	0.5	

ND -NOT DETECTED

TABLE:56 ORGANOHALIDES IN ABITIBI PRICE INC.,
FORT WILLIAM DIVISION, EFFLUENTS.

CONCENTRATIONS (UG/L = PPB) OF ORGANOHALIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	CHLOROFORM	CARBON TETRACHLORIDE	TRIECTHYLORENE	DICHLOROBROMOMETHANE	CHLORODIBROMOMETHANE	TETRACHLORETHYLENE
JULY 21,1982:						
COMBINED FINAL EFFLUENT*	11	ND	ND	ND	ND	ND
FINAL EFFLUENT**	13	ND	ND	ND	ND	ND
WOODROOM EFFLUENT	9	ND	ND	ND	ND	ND
SCMP EFFLUENT	19	ND	ND	ND	ND	ND
DETECTION LIMIT	1.0	0.1	2.0	0.5	1.0	0.5

ND -NOT DETECTED
* -NO.1 & NO.2 LAGOON EFFLUENTS & WOODROOM EFFLUENT
** -NO.1 & NO.2 LAGOON EFFLUENTS
SCMP-SEMI CHEMICAL MECHANICAL PULPING

TABLE:57 ORGANOHALIDES IN ABITIBI PRICE INC.,
THUNDER BAY DIVISION, EFFLUENTS AND MILL INTAKE WATER.

	CONCENTRATIONS (UG/L = PPB) OF ORGANOHALIDES					
DATE SAMPLED/ SAMPLE DESCRIPTION	CHLOROFORM	CARBON TETRACHLORIDE	TRICHLOROETHYLENE	DICHLOROBROMOMETHANE	CHLORODIBROMOMETHANE	TETRACHLOROETHYLENE
JUNE 3,1982:						
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND
JUNE 16,1982:						
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND
JULY 21,1982:						
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND
JULY 22,1982:						
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND
JULY 23,1982:						
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	1.0	0.1	2.0	0.5	1.0	0.5

ND -NOT DETECTED

TABLE:58 ORGANOHALIDES IN BOISE CASCADE CANADA LIMITED, FORT FRANCES, EFFLUENTS.

	CONCENTRATIONS (UG/L = PPB) OF ORGANOHALIDES					
DATE SAMPLED/ SAMPLE DESCRIPTION	CHLOROFORM	CARBON TETRACHLORIDE	TRICHLOROETHYLENE	DICHLOROBROMOMETHANE	CHLORO-DIBROMOMETHANE	TETRACHLOROETHYLENE
JULY 13,1982:						
FINAL EFFLUENT	500	ND	ND	ND	ND	ND
SECONDARY LAGOON INFLUENT	ND	ND	ND	ND	ND	ND
SECONDARY LAGOON EFFLUENT	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	1.0	0.1	2.0	0.5	1.0	0.5

ND -NOT DETECTED

TABLE:59 ORGANOHALIDES IN DOMTAR PACKAGING/KRAFT PAPER AND BOARD DIVISION RED ROCK MILL, EFFLUENTS.

CONCENTRATIONS (UG/L = PPB) OF ORGANOHALIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	CHLOROFORM	CARBON TETRACHLORIDE	TRICHLOROETHYLENE	DICHLOROBROMOMETHANE	CHLORODIBROMOMETHANE	TETRACHLOROETHYLENE
JUNE 14,1982:						
FINAL EFFLUENT*	--	--	--	--	--	--
JULY 5,1982:						
WOODROOM EFFLUENT:						
ALUM UNTREATED	ND	ND	ND	ND	ND	ND
ALUM TREATED	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	1.0	0.1	2.0	0.5	1.0	0.5

ND -NOT DETECTED
-- -NOT AVAILABLE

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

TABLE:60 ORGANOHALIDES IN GREAT LAKES FOREST PRODUCTS LIMITED, DRYDEN, EFFLUENT.

	CONCENTRATIONS (UG/L = PPB) OF ORGANOHALIDES					
DATE SAMPLED/ SAMPLE DESCRIPTION	CHLOROFORM	CARBON TETRACHLORIDE	TRICHLOROETHYLENE	DICHLOROBROMOMETHANE	CHLORODIBROMOMETHANE	TETRACHLOROETHYLENE
AUGUST 23,1982: FINAL EFFLUENT	1639	ND	ND	ND	ND	10
DETECTION LIMIT	1.0	0.1	2.0	0.5	1.0	0.5

ND -NOT DETECTED

TABLE:61 ORGANOHALIDES IN GREAT LAKES FOREST PRODUCTS LIMITED, THUNDER BAY, EFFLUENT.

	CONCENTRATIONS (UG/L = PPB) OF ORGANOHALIDES					
DATE SAMPLED/ SAMPLE DESCRIPTION	CHLOROFORM	CARBON TETRACHLORIDE	TRICHLOROETHYLENE	DICHLOROBROMOMETHANE	CHLORO-DIBROMOMETHANE	TETRACHLOROETHYLENE
JUNE 8,1982: FINAL EFFLUENT	4036	ND	ND	9	ND	ND
DETECTION LIMIT	1.0	0.1	2.0	0.5	1.0	0.5

ND -NOT DETECTED

TABLE:62 ORGANOHALIDES IN JAMES RIVER MARATHON LTD., (FORMERLY: AMERICAN CAN CANADA INC.), EFFLUENTS.

CONCENTRATIONS (UG/L = PPB) OF ORGANOHALIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	CHLOROFORM	CARBON TETRACHLORIDE	TRICHLOROETHYLENE	DICHLOROBROMOMETHANE	CHLORODIBROMOMETHANE	TETRACHLOROETHYLENE
JUNE 22,1982:						
FINAL EFFLUENT	8	ND	ND	ND	ND	ND
MAIN MILL EFFLUENT	ND	ND	ND	ND	ND	ND
ACIDIC SEWER EFFLUENT	3	ND	ND	ND	ND	ND
ALKALINE SEWER EFFLUENT	4	ND	ND	ND	ND	ND
AUGUST 16,1982:						
FINAL EFFLUENT	504	ND	ND	ND	ND	ND
DETECTION LIMIT	1.0	0.1	2.0	0.5	1.0	0.5

ND -NOT DETECTED

TABLE:63 ORGANOHALIDES IN KIMBERLY-CLARK OF CANADA LIMITED, TERRACE BAY, EFFLUENT.

	CONCENTRATIONS (UG/L = PPB) OF ORGANOHALIDES					
DATE SAMPLED/ SAMPLE DESCRIPTION	CHLOROFORM	CARBON TETRACHLORIDE	TRICHLOROETHYLENE	DICHLOROMETHANE	CHLORODIBROMOMETHANE	TETRACHLOROETHYLENE
AUGUST 10,1982: FINAL EFFLUENT	613	ND	ND	ND	ND	ND
DETECTION LIMIT	1.0	0.1	2.0	0.5	1.0	0.5

ND -NOT DETECTED

TABLE:64 POLYCHLORINATED BIPHENYLS (PCB'S) AND ORGANOCHLORINE PESTICIDES IN ABITIBI PRICE FINE PAPERS, PORT ARTHUR DIVISION, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (NG/L = PPT) OF PCB'S AND ORGANOCHLORINE PESTICIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	PCB'S TOTAL	ALDRIN	ALPHA-BHC	BETA-BHC	GAMMA-BHC	ALPHA-CHLORDANE	GAMMA-CHLORDANE	DIELDRIN	DMDT-METHOXYCHLOR	ENDOSULPHAN 1	ENDOSULPHAN 2	ENDRIN	ENDOSULPHAN SULPHATE	HEPTACHLOR EPOXIDE	HEPTACHLOR	HEPTACHLOR MIREX	OXYCHLORDANE	OPDDT	PPDDD	PPDDE	PPDDT	HEXACHLOROBENZENE
JULY 7,1982:																						
GROUNDWOOD EFFLUENT	60	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAPER MILL EFFLUENT	ND	ND	4	ND	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AUGUST 4,1982																						
FINAL EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MILL INTAKE WATER	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	20	1	1	1	1	2	2	2	5	2	4	4	4	1	1	5	2	5	5	1	5	1

ND -NOT DETECTED
-- -NOT AVAILABLE

TABLE:65 POLYCHLORINATED BIPHENYLS (PCB'S) AND ORGANOCHLORINE PESTICIDES IN ABITIBI PRICE INC., FORT WILLIAM DIVISION, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (NG/L = PPT) OF PCB'S AND ORGANOCHLORINE PESTICIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	PCB'S TOTAL	ALDRIN	ALPHA-BHC	BETA-BHC	GAMMA-BHC	ALPHA-CHLORDANE	GAMMA-CHLORDANE	DIELDRIN	DMDT-METHOXYCHLOR	ENDOSULPHAN 1	ENDOSULPHAN 2	ENDRIN	ENDOSULPHAN SULPHATE	HEPTACHLOR EPOXIDE	HEPTACHLOR	MIREX	OXYCHLORDANE	OPP-DDT	PPDDD	PPDDE	PPDDT	HEXACHLOROBENZENE
JULY 21,1982:																						
COMBINED FINAL EFFLUENT*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FINAL EFFLUENT**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WOODROOM EFFLUENT	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SCMP EFFLUENT	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	20	1	1	1	1	2	2	2	5	2	4	4	4	1	1	5	2	5	5	1	5	1

ND -NOT DETECTED
* -NO.1 & NO.2 LAGOON EFFLUENTS AND WOODROOM EFFLUENT (* -NO.1 & NO.2 LAGOON EFFLUENTS
SCMP-SEMI CHEMICAL MECHANICAL PULPING

TABLE:66 POLYCHLORINATED BIPHENYLS (PCB'S) AND ORGANOCHLORINE PESTICIDES IN ABITIBI PRICE INC., THUNDER BAY DIVISION, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (NG/L = PPT) OF PCB'S AND ORGANOCHLORINE PESTICIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	PCB'S TOTAL	ALDRIN	ALPHA-BHC	BETA-BHC	GAMMA-BHC	ALPHA-CHLORDANE	GAMMA-CHLORDANE	DIELDRIN	DMDT-METHOXYCHLOR	ENDOSULPHAN 1	ENDOSULPHAN 2	ENDRIN	ENDOSULPHAN SULPHATE	HEPTACHLOR EPOXIDE	HEPTACHLOR	MIREX	OXYCHLORDANE	OPP-DDT	PPDDD	PPDDE	PPDDT	HEXACHLOROBENZENE
JUNE 3,1982:																						
FINAL EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MILL INTAKE WATER	ND	ND	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JUNE 16,1982:																						
FINAL EFFLUENT	ND	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	6	ND	1	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 21,1982:																						
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 22,1982:																						
FINAL EFFLUENT	ND	ND	5	1	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 23,1982:																						
FINAL EFFLUENT	ND	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	20	1	1	1	1	2	2	2	5	2	4	4	4	1	1	5	2	5	5	1	5	1

ND -NOT DETECTED
-- -NOT AVAILABLE

TABLE:67 POLYCHLORINATED BIPHENYLS (PCB'S) AND ORGANOCHLORINE PESTICIDES IN BOISE CASCADE CANADA LIMITED, FORT FRANCES, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (NG/L = PPT) OF PCB'S AND ORGANOCHLORINE PESTICIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	PCB'S TOTAL	ALDRIN	ALPHA-BHC	BETA-BHC	GAMMA-BHC	ALPHA-CHLORDANE	GAMMA-CHLORDANE	DIELDRIN	DMDT-METHOXYCHLOR	ENDOSULPHAN 1	ENDOSULPHAN 2	ENDRIN	ENDOSULPHAN SULPHATE	HEPTACHLOR EPOXIDE	HEPTACHLOR	MIREX	OXYCHLORDANE	OPDDD	PPDDD	PPDDE	PPDDT	HEXACHLOROBENZENE
JULY 13,1982:																						
FINAL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SECONDARY LAGOON INFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SECONDARY LAGOON EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	20	1	1	1	1	2	2	2	5	2	4	4	4	1	1	5	2	5	5	1	5	1

ND -NOT DETECTED

TABLE:68 POLYCHLORINATED BIPHENYLS (PCB'S) AND ORGANOCHLORINE PESTICIDES IN DOMTAR PACKAGING/KRAFT PAPER AND BOARD DIVISION RED ROCK MILL, EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (NG/L = PPT) OF PCB'S AND ORGANOCHLORINE PESTICIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	PCB'S TOTAL	ALDRIN	ALPHA-BHC	BETA-BHC	GAMMA-BHC	ALPHA-CHLORDANE	GAMMA-CHLORDANE	DIELDRIN	DMDT-METHOXYCHLOR	ENDOSULPHAN 1	ENDOSULPHAN 2	ENDRIN	ENDOSULPHATE	HEPTACHLOR EPOXIDE	HEPTACHLOR	MIREX	OXYCHLORDANE	OPP-DDT	PPP-DDD	PPP-DDE	PPP-DDT	HEXACHLOROBENZENE
JUNE 14,1982:																						
FINAL EFFLUENT *	ND	ND	24	24	28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 5,1982:																						
WOODROOM EFFLUENT:																						
ALUM UNTREATED	235	2	18	26	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ALUM TREATED	970	ND	11	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 17,1983:																						
FINAL EFFLUENT *	35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	ND	ND
MILL INTAKE WATER	ND	ND	1	ND	ND	ND	6	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 18,1983:																						
FINAL EFFLUENT *	65	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	ND	ND
MILL INTAKE WATER	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 19,1983:																						
FINAL EFFLUENT *	ND	ND	9	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	ND	ND
MILL INTAKE WATER	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 20,1983:																						
FINAL EFFLUENT *	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
JULY 21,1983:																						
FINAL EFFLUENT *	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	20	1	1	1	1	2	2	2	5	2	4	4	4	1	1	5	2	5	5	1	5	1

ND -NOT DETECTED
-- -NOT AVAILABLE

* NOTE: Mill effluent samples from Domtar Packaging also contained effluent from the Red Rock Water Pollution Control Plant

TABLE:69 POLYCHLORINATED BIPHENYLS (PCB'S) AND ORGANOCHLORINE PESTICIDES IN GREAT LAKES FOREST PRODUCTS LIMITED, DRYDEN, EFFLUENT AND MILL INTAKE WATER.

CONCENTRATIONS (NG/L = PPT) OF PCB'S AND ORGANOCHLORINE PESTICIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	PCB'S TOTAL	ALDRIN	ALPHA-BHC	BETA-BHC	GAMMA-BHC	ALPHA-CHLORDANE	GAMMA-CHLORDANE	DIELDRIN	DMDT-METHOXYCHLOR	ENDOSULPHAN 1	ENDOSULPHAN 2	ENDRIN	ENDOSULPHAN SULPHATE	HEPTACHLOR EPOXIDE	HEPTACHLOR	HEPTACHLOR EPOXIDE	MIREX	OXYCHLORDANE	OPDDD	PPDDD	PPDDE	PPDDT	HEXACHLOROBENZENE
AUGUST 23,1982:																							
FINAL EFFLUENT	65	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	30	ND	12	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	20	1	1	1	1	2	2	2	5	2	4	4	4	1	1	5	2	5	5	1	5	1

ND -NOT DETECTED

TABLE:70 POLYCHLORINATED BIPHENYLS (PCB'S) AND ORGANOCHLORINE PESTICIDES IN GREAT LAKES FOREST PRODUCTS LIMITED, THUNDER BAY, EFFLUENT AND MILL INTAKE WATER.

CONCENTRATIONS (NG/L = PPT) OF PCB'S AND ORGANOCHLORINE PESTICIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	PCB'S TOTAL	ALDRIN	ALPHA-BHC	BETA-BHC	GAMMA-BHC	ALPHA-CHLORDANE	GAMMA-CHLORDANE	DIELDRIN	DMDT-METHOXYCHLOR	ENDOSULPHAN 1	ENDOSULPHAN 2	ENDRIN	ENDOSULPHAN SULPHATE	HEPTACHLOR EPOXIDE	HEPTACHLOR	HEXACHLOROBENZENE	OXYCHLORDANE	OPDDT	PPDDD	PPDDE	PPDDT	HEXACHLOROBENZENE
JUNE 8,1982:																							
FINAL EFFLUENT	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	20	1	1	1	1	2	2	2	5	2	4	4	4	1	1	5	2	5	5	1	5	1	

ND -NOT DETECTED

TABLE:71 POLYCHLORINATED BIPHENYLS (PCB'S) AND ORGANOCHLORINE PESTICIDES IN JAMES RIVER MARATHON LTD.,(FORMERLY AMERICAN CAN CANADA INC.), EFFLUENTS AND MILL INTAKE WATER.

CONCENTRATIONS (NG/L = PPT) OF PCB'S AND ORGANOCHLORINE PESTICIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	PCB'S TOTAL	ALDRIN	ALPHA-BHC	BETA-BHC	GAMMA-BHC	ALPHA-CHLORDANE	GAMMA-CHLORDANE	DIELDRIN	DMDT-METHOXYCHLOR	ENDOSULPHAN 1	ENDOSULPHAN 2	ENDRIN	ENDOSULPHAN SULPHATE	HEPTACHLOR EPOXIDE	HEPTACHLOR	HEPTACHLOR EPOXIDE	MIREX	OXYCHLORDANE	OPP-DDD	PPDDD	PPDDE	PPDDT	HEXACHLOROBENZENE
JUNE 22,1982:																							
FINAL EFFLUENT	2210	ND	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MAIN MILL EFFLUENT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ACIDIC SEWER EFFLUENT	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2
ALKALINE SEWER EFFLUENT	90	ND	11	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	22
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AUGUST 16,1982:																							
FINAL EFFLUENT	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	20	1	1	1	1	2	2	2	5	2	4	4	4	1	1	5	2	5	5	1	5	1

ND -NOT DETECTED

TABLE:72 POLYCHLORINATED BIPHENYLS (PCB'S) AND ORGANOCHLORINE PESTICIDES IN KIMBERLY-CLARK OF CANADA LIMITED, TERRACE BAY, EFFLUENT AND MILL INTAKE WATER.

CONCENTRATIONS (NG/L = PPT) OF PCB'S AND ORGANOCHLORINE PESTICIDES

DATE SAMPLED/ SAMPLE DESCRIPTION	PCB'S TOTAL	ALDRIN	ALPHA-BHC	BETA-BHC	GAMMA-BHC	ALPHA-CHLORDANE	GAMMA-CHLORDANE	DIELDRIN	DMDT-METHOXYCHLOR	ENDOSULPHAN 1	ENDOSULPHAN 2	ENDRIN	ENDOSULPHAN SULPHATE	HEPTACHLOR EPOXIDE	HEPTACHLOR	MIREX	OXYCHLORDANE	OPDDT	PPDDD	PPDDE	PPDDT	HEXACHLOROBENZENE
AUGUST 10,1982:																						
FINAL EFFLUENT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MILL INTAKE WATER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DETECTION LIMIT	20	1	1	1	1	2	2	2	5	2	4	4	4	1	1	5	2	5	5	1	5	1

ND -NOT DETECTED
-- -NOT AVAILABLE

APPENDIX C

Table 1: Preliminary List of Trace Contaminants of Concern which should be included for Monitoring Pulp and Paper Mill Effluents in Ontario*

CONTAMINANTS	CONCERN
Aluminum	criteria in development, high in waste metals
Benzene	moderately toxic(a), low bioaccumulation(b), non-persistent(c), animal and suspect human carcinogen
Bromodichloromethane	mutagen
Cadmium	extremely toxic, moderately bioaccumulative
Carbon Tetrachloride	slightly toxic, non-persistent, animal and suspect human carcinogen
Chloroacetaldehyde	mutagen
Chlorodehydroabietic Acids	toxic, persistent
Chloroform	slightly toxic, non-persistent, animal and suspect human carcinogen
Chlorofuranone	mutagen
Chloropropenal	mutagen
Copper	regulated
Dehydroabietic Acid	toxic, persistent
Dibutyl Phthalate	human health
Dichloroacetone	mutagen
Dichloroethane	slightly toxic, non-persistent, animal carcinogen
Dichloromethane	mutagen
Fatty Acids	toxic
Hexachloroacetone	mutagen
Lead	extremely toxic
Mercury	extremely toxic, highly bioaccumulative
Neoabietic Acid	mutagen
Pentachloroacetone	mutagen
Pentachlorophenol	extremely toxic, very persistent
Pentachloropropene	mutagen
Phenols	toxic, impair flavour
PCBs	high bioaccumulation, very persistent
PCDDs	animal carcinogens
PCDFs	potential animal carinogens
Resin Acids	toxic
2,3,7,8-TCDD	animal carcinogen & teratogen
Tetrachloroacetone	mutagen
Tetrachloroethene	mutagen
Tetrachloroguaiacol	toxic, persistent
Tetrachloropropene	mutagen
Toluene	moderately toxic, non-persistent, cancer promoter
Trichloroacetone	mutagen
Trichloroethane	moderately toxic, non-persistent, 1,1,1-isomer: mutagen; 1,1,2-isomer: carcinogen
Trichloroethene	mutagen
Trichloroguaiacol	toxic, persistent
Trichlorophenol	extremely toxic, persistent, 2,4,6-isomer: possible animal carcinogen
Zinc	regulated

* = prepared by Cecil Inniss, MOE (unpublished)
(a) = toxic to aquatic biota
(b) = bioaccumulates in aquatic biota
(c) = persistent in the aquatic environment
PCBs = Polychlorinated biphenyls
PCDDs = Polychlorinated dibenzodioxins
PCDFs = Polychlorinated dibenzofurans
TCDD = Tetrachlorodibenzodioxin

APPENDIX D

ABBREVIATIONS & SYMBOLS:

A	Approximately
ACGIH	American Conference of Governmental Industrial Hygienists
APFP	Abitibi Price Fine Papers, Port Arthur Division
APFW	Abitibi Price Inc., Fort William Division
APTB	Atibiti Price Inc., Thunder Bay Division
BAT	Best Available Technology Economically Achievable
BHC	Hexachlorocyclohexane
BOD	Biological Oxygen Demand
BOISE	Boise Cascade Canada Ltd.
COA	Canada - Ontario Agreement Respecting Great Lakes Water Quality
COD	Chemical Oxygen Demand
CP	Chlorophenols
CPAR	Committee on Pollution Abatement Research
DCP	Dichlorophenols
DOC	Dissolved Organic Carbon
DOMTAR	Domtar Packaging/Kraft Paper and Board Division, Red Rock Mill
E. coli	Escherichia coli
FTU	Formazin Turbidity Units
GC/MS	Gas Chromatography/Mass Spectrometry
GLFP	Great Lakes Forest Products Ltd., (Dryden)
GLFPTB	Great Lakes Forest Products Ltd., (Thunder Bay)
GLWQA	Great Lakes Water Quality Agreement
HZ	Hazen Units
IJC	International Joint Commission
JR	James River Marathon Ltd.
KC	Kimberly-Clark of Canada Ltd.
LC50	Lethal Concentration 50
MOE	Ontario Ministry of the Environment
mg/L	Milligrams/Litre
mL	Millilitres
N	Number of Samples
NA	Not Available

ABBREVIATIONS & SYMBOLS: (Cont'd)

ND	Not Detected
NL	Non Lethal
ng/L	Nanograms/Litre
P & P	Pulp and Paper
PCB	Polychlorinated biphenyls
PCDD	Polychlorinated dibenzodioxins
PCDF	Polychlorinated dibenzofurans
PCP	Pentachlorophenols
PPB	Parts Per Billion
PPM	Parts Per Million
PPT	Parts Per Trillion
PWQO	Provincial Water Quality Objective
SCMP	Semi Chemical Mechanical Pulping
SU	Standard Units
TCDD	Tetrachlorodibenzodioxin
TCP	Trichlorophenols
TKN	Total Kjeldahl Nitrogen
TP	Total Phosphorus
TS	Total Solids
TSS	Total Suspended Solids
TTCP	Tetrachlorophenols
USDHHS	United States Department of Health and Human Services
USEPA	United States Environmental Protection Agency
µg/L	Micrograms/Litre
µs/cm	Microsiemens/Centimetre
--	Not Available
<	Less Than
>	Greater Than
%	Percent